Gyn. Staff Room University Hospital.

The Journal of Obstetrics and Gynæcology of the British Empire

Vol. XV. JANUARY, 1909. No. 1.

Rösslin's "Rosegarten": Its Relation to the Past (the Muscio Manuscripts and Soranos), particularly with regard to Podalic Version.*

By E. Ingerslev, M.D., Copenhagen.

In this Journal (Oct. 1906, Sept. 1907, and Oct. 1907), Dr. J. W. Ballantyne has dealt in extenso, and in a very interesting manner, with the curious book called "The Byrthe of Mankynde," which, as he says, "profoundly influenced the practice of the art of midwifery in these Islands for more than three centuries." He has explained the relation between the first edition of 1540—a translation of Rösslin by Richard Jonas, "the studious and diligent clarke"—and the second of 1545, from "top to toe revised," by Thomas Raynalde, the physician; and, finally, he has accounted for 11 further English editions of the latter up to the year 1656.

Not in England only did Rösslin's book leave its mark thus profoundly, but throughout the whole of Europe; and it is on the whole doubtful whether any other medical work has been translated into as many European languages as the little book which Eucharius Rösslin, in Worms, in 1513, handed to his exalted protectress, Catharine, Princess of Saxony and Duchess of Brunswick and Lüneburg, and which was intended to improve the miserable state of the art of midwifery of that day. We shall see later how far it succeeded in so doing. But partly on account of the great importance of the book during the 16th century and after, as shown by its extensive use, and partly as a supplement to Dr. Ballantyne's article on its English representative, I have thought that it might be of interest, especially with reference to podalic version, to give a partial account of Rösslin's "Rosegarten" which, as Fasbender, in his last great work (1906) says, forms a milestone in the history of mid-

* This article is based on a section of my "Fragments of the History of Midwifery," published—in Danish—in 1906.

wifery. Finally, I will endeavour to throw some light on its relations to the past as well as to the renaissance in obstetrics which shortly followed its publication, and which was inaugurated by Paré and Guillemeau.

Rösslin's work was hardly based on original obstetrical experience. Even though it is perhaps scarcely fair—as Siebold does—to deny entirely that he had any practical knowledge of midwifery, his book was principally a compilation drawn from the ancient and mediæval periods, namely from Hippokrates and Galen to Avicenna and Albertus Magnus respectively; and still in another way it was especially influenced by the ancients, though this perhaps does not directly appear; yet, in my opinion, this is what chiefly makes his work so interesting and to which I shall revert later.

For, in the strictest sense, the "Rosegarten" did not belong to the Incunabula, but was the earliest printed work on an exclusively obstetrical subject and—what is of especial interest—contained the earliest obstetrical figures printed from wood-blocks. If it is accepted that the earliest printed productions were largely modelled on the manuscripts as regards the form of the letters, abbreviations, and the whole arrangement of the subject matter, so that it is hard for an unpractised eye to discern between the Incunabula and a contemporary manuscript, then it probably is no less the case that the many illustrations in the earliest printed books were copies from the great wealth of pictures, miniatures, initials, etc., contained in the manuscripts. And this brings us to the question whether the wood-cuts, the celebrated "Birth Figures," in the "Rosegarten" are Rösslin's own handiwork or were obtained from elsewhere?

Before attempting to answer this question we must be allowed to make a digression—a great step backwards in time——and to mention briefly Soranos, the Ephesian, whose advanced views on obstetrics were not adopted nor improved upon, the man who, though the greatest obstetrician of antiquity, was but a rapidly vanishing meteor and hardly left any trace behind him. We only get sporadic glimpses of him again in those mediæval times which were so poor in literature dealing with obstetrics.

Soranos studied in Alexandria, went from there to Rome, where he worked as a physician during the reigns of Trajan and Hadrian, that is to say in the period 98—138 A.D.—a short time in advance of Galen. His literary productivity was great and embraced many branches of medical science. But until the present day we have only known it in the form of stolen goods, in the works of other authors. This applies to internal pathology as well as to gynæcology. Soranos' special legacy to the medical sciences as gynæcologist is chiefly to be found in the works of Oreibasios (7th century) and Aëtios (6th century); in the case of the latter as a small

section on the signs of fecundity and in the former as a small chapter, "de vulva et pudendo muliebri," which certainly shows an advance on Hippokrates' anatomical views, but otherwise does not justify one in giving Soranos a more prominent position in the history of obstetrics. For long, indeed, he did not enjoy a notable position, even in Siebold's estimation, when he, in 1838, published the first volume of his remarkable "History of Midwifery." In this work he was, as in all previous writings, entirely overshadowed by another, Moschion, who was considered as a slightly younger contemporary of Soranos and got the credit for the authorship of the first real book on Midwifery of antiquity known up to that time.

This relative position has, however, in recent times been completely reversed; interesting discoveries with regard to Soranos, as well as Moschion, have put the matter in another light and given Soranos the place of honour as the greatest obstetrician of antiquity and assigned a more modest place to Moschion.

The originator of these discoveries was Fr. Reinboldt Dietz, who, at the age of 30, was professor at the Academia Albertina in Königsberg, and who—aided by the government—searched the libraries of Europe in order to study ancient medical manuscripts. He found, in 1838, in Paris, in a Greek manuscript from the 15th century, an article on women's diseases which, to his astonishment, proved to be the book of Soranos which had been assumed to have been lost centuries ago, and now was discovered almost complete. After taking a copy he went to Italy and found at the Vatican a similar manuscript, compared the texts of both, and returned to Königsberg to publish his rare find, but died while the work was being printed. Thereupon a friend, Lobeck, completed it: "Sorani Ephesii, De arte obstetricia morbisque mulierium quae supersunt, Regimonti Prussorum, 1838." As neither this work nor a subsequent Program by Haeser (Jena 1840) and a dissertation by the Pole, Pinoff, (Breslau 1841)—both in Latin—excited particular interest, the latter published in "Janus," 1846 to 1847, a treatise in German with reference to Soranos' Obstetrics, but "Janus" only lasted three years and was little known especially outside Germany. Dietz's (Greek) work became more accessible through the learned Dutchman, Ermorins', edition of 1869, in which to the text was added a Latin translation; but, as was but natural, attention thereto was drawn by philologists rather than by physicians. Though a reference to Ermorins' work was made by Dr. Guardia in the *Gaz. méd. de Paris*, 1869–70, it was, as far as France is concerned, chiefly the medical Historian, Hergott, who in 1882, in the *Annales de gynécologie*, clearly stated Soranos' position as an obstetrician, particularly with reference to podalic version. But during the same year a splendid work appeared at Leipzig by the celebrated philologist, Valentin Rose,—until lately director of the Royal library at Berlin, a work to which we shall revert later, and which, through new discoveries in this field, has made quite clear the relative positions of Soranos and Moschion. Hergott has later (in 1893) in the notes to his French translation of Siebold paid a well-deserved tribute to Rose's labours; and finally, Soranos' *Gynaecology* appeared in 1894 in German (Lüneburg and Huber).

The anatomical fragment on the genital organs by Soranos, found in Oreibasios, was, until Dietz's discovery in 1838, practically his only gynæcological work handed down to us; but it may be considered

doubtful whether credit is due to him for the advance made in anatomy in this chapter as compared with Hippokrates. His contemporary, Ruphos of Ephesos, has written a work exclusively anatomical, having the modest title "On the names of the parts of the human body," which contains the same new matter concerning the anatomy of the genital organs as is contained in Soranos', and in some ways gives a more correct description. And as Soranos, as belonging to the methodist school, had but little respect for anatomy, and frankly declares a knowledge thereof unnecessary for midwives, there is hardly any necessity to give him credit for much originality on this subject. He was, at any rate, no follower of the saying: "propter uterum mulier est," for his own gynæcology begins by questioning whether there are any illnesses belonging peculiarly to women. This he is inclined to deny, saying: "such a statement cannot be founded on the fact of there being special physicians for women, or because women generally call a midwife, and experience has shown that—as Themison did—one can excise a prolapsed uterus, just as it is known that in Gaul the pigs become fat and thrive well when this organ is removed."

As opposed to the earlier description of the uterus, which was founded on the anatomy of the animals, Soranos' (and Ruphos') idea of comparing it with a cupping glass is, on the whole, felicitous. Soranos certainly has, as will be shown later, accompanied his description of the uterus by a drawing. Dietz, however, found none in the manuscript used by him. But the earliest drawing of the female uterus known by us in the only manuscript known to contain one, points towards Soranos. And, from our reproduction of this (Fig. 2) it will be manifest that Soranos' terminology with reference to the expressions Collum uteri and Orificium uteri, is of a more modern pattern than that used much later.

Being of the Alexandrian school he knew the testes muliebres, the ovaries, but still held the antiquated opinion that the meatus seminarii (Tubes) ran from them along the sides of uterus towards the neck of the bladder, from which he concludes that the female seed has nothing to do with the conception. How this view of the course of the so-called seminal channels arose—whether by mistaking them for the urethra, ligamenta rotunda, or for Gartner's ducts—must remain an open question. Possibly the latter of the three would suit those anatomists best who, even up to the end of the 16th century (Dulaurens), gave the same course to one of the branches (Tube) of the Vasa ejaculatoria for the passage of the female seed in coitus during pregnancy, instead of by the usual way; a result of the wisdom of nature, it is added, for coitus is most keenly enjoyed during pregnancy, as by the passage of the semen through the long and narrow way the excitement is greater (!)—a theory concerning which Mauriceau remarks: "C'est pourquoi chacun peut (si bon lui

semble) consulter les femmes sur ce sujet pour en connaître la vérité par leur bouche."

Considerable discussion, which arose later, would possibly have been avoided if Soranos had established the existence of the hymen, which he denied, basing his views on his experience as a gynæcologist, which showed him that there was no difficulty in the introduction of a speculum in virgins, scarcely a criterion—says the German author Kossmann—for how rarely would a much occupied physician in Imperial Rome examine a virgo intacta. Possibly the cause may be that the Roman midwives ruptured this superfluous structure in the newly-born maidens just as they did the frænum, as Vesalius mentions was the custom of Italian midwives and wherein he saw the explanation of the disbelief current among so many people of the existence of the hymen. Perhaps the same was the case in Paris, where Paré, while examining a number of girls under 12 years of age, never came across a hymen, and consequently considered this as pathological. (In China and India the hymen is removed for reasons of cleanliness; this has also been done by native nurses in the case of European children; whilst among all other oriental people the presence of the hymen is highly valued as a proof of virginity.)

But it is mainly in practical midwifery—as compared with theoretical—that Soranos has made his name as a pioneer of a truly rational and humane kind of midwifery when compared with that of the past; and we shall briefly relate the main points thereof.

Not unlike Celsus, who in writing the introduction to his "Surgery" begins by an exposition of the "Qualities" which the surgeon ought to possess, Soranos starts by mentioning those of a midwife, which he minutely discusses with regard to the physical, moral, and intellectual sides of the question. Principally, of course, their help is needed in ordinary cases, but also in abnormal cases; and for these the most talented ones are chosen, because the midwife must be versed in the whole of therapeutics, "at times she must act dietetically, at others as a surgeon, and yet at others pharmaceutically." Contrary to the opinions of others Soranos does not consider it necessary that she shall have been a mother herself; but she must not be superstitious (literally translated "be without fear of the demons"). (On the whole, mysticism and superstition seem to be foreign to Soranos; he never mentions the use of the "Aëtite" during the labour, and speaks with contempt of other kinds of amulets to prevent conception, etc., particularly mentioning the ear wax of a mule.)

The assistance and apparatus needed at a birth is, besides the midwife, three female helps, a birth-chair and two beds (one soft and another hard). On the latter the woman rests until labour begins, when she is carried to the chair. In front of the latter "in clean clothes" sits the midwife, and a little lower (but not in a hollow, "as

Heron has suggested, it is impracticable and unsuitable for 2-storied houses") stand the two helps and behind the third assistant. Soranos appears to dispel all doubts as to the antiquity of the birth-chair, inasmuch as he speaks of its use in the day of Herophilos. He himself gives a detailed description of it, with the crescent-shaped notch to allow the fœtus to pass, so closely agreeing with the first printed description and drawing we possess of a birth-chair done by Eucharius Rösslin (1513) that one might imagine that Soranos was a contemporary of Rösslin, or *vice versâ*. He speaks, in a deprecatory manner, of the many curious "finesses" applied in connection with the chair as for instance a cross bar below, with a handle and a rotating axle, to which slings could be attached which were fixed to the fœtus, so that the attendant, by turning the handle, exerted a mechanical pull on it (similar to the mechanical traction by forceps extraction proposed by Chassagny in 1860). But Soranos rejects this, maintaining that in difficult labours the patient must be in a reclining position, and for this the apparatus is unsuitable. If no birth-chair is available the parturient patient can sit in the lap of a strong woman and be delivered of the child there—a method which had its followers until quite late in history. Thus Peter Forestus, a physician in Delft at the end of the 16th century, mentions in one of his "Observations"—wherein he denies the loosening of the bones of the pelvis but points out the importance of the free movement of the coccyx during the birth—that the midwives of Delft to this end employ strong women in whose lap the parturient woman sits, so that the coccyx does not suffer pressure; and in his treatise on midwifery (1684) the Dutch surgeon, Cornelius Solingen, also relates that in places in his country women are called "Schootsters" who allow themselves to be used in lieu of the birth-chair. The same was also the case in other countries such as Germany, France, Scotland and Norway up to quite lately.

The aid, in the case of natural labour, therefore, rendered by the persons present was, according to Soranos, only that the midwife with her index finger (anointed and with the nails cut short) gently dilated the os uteri, if there were but slight labour pains, and received the child. The women standing at the sides of the mother gently rubbed the abdomen with the spread fingers of the hands (Kristeller's expression?) but only during the pains, and the assistant, standing behind, steadied the anus by means of a linen cloth, fixed thereto at the moment of expulsion of the head (perineal support).

It was thought desirable that the after-birth should be delivered nearly simultaneously with the child. But the rules as to the after-birth period is one of the points where Soranos especially shows his insight and sober criticism of his predecessors, Hippokrates as well as the Herophilean school. He disapproved of all means to produce sneezing, of using pessaries of herbs, steaming with herbs (nardus, cinnamon, lillies, artemisia, etc.), pulling on the placenta by

means of the weight of the child, or—if it was delivered—by leaden weights attached to the navel-string, shaking on a ladder, all of which found followers for a long time, but were considered by him as impracticable and dangerous, giving rise to hæmorrhage, fainting and inflammation. The after-birth ought to be removed by a gentle pull on the navel-string, but methodically, rocking it from side to side. If it does not come the hand should be put up and take it; if it is partly or entirely fixed it is loosened cautiously. If this does not succeed, or if the orificium is closed, the child is "navelled," and then one has to wait till—by aid of relaxing measures (poultices, injections)—the cramp subsides, when it is often spontaneously delivered. Such rules deserved to gain disciples among the leading lights in midwifery of the 17th century, as for instance Mauriceau and Deventer, to mention a couple of names only.

But above all it is in the rules to be observed in difficult labours that Soranos became the spokesman for so rational and relatively gentle principles that the forgetfulness, which later obscured him and his teachings, must excite wonder and regret. And, moreover, his claim to distinction does not depend on his own genius or any new view of obstetrics, for it is especially in his introduction to these sections that he cites predecessors such as Herophilos, Demetrios and other Alexandrians, as an indication, perhaps, that part of his teaching was a tradition. In justice, however, we now—in the absence of other safe sources—should give him the priority as far as that obstetrical operation is concerned, the forgetting of which became so fatal, namely podalic version in the case of a living child.

Only a few points in his exposition of difficult labour will be given here, partly in order not to tire the reader by too many details, and partly because these will be mentioned when we come to discuss Soranos' position relative to Moschion, and again in reproducing the drawings of the various positions of the fœtus which are found in the Moschion manuscripts, but which in reality should be traced back to Soranos and his explanation of the rectification of the abnormal positions.

The normal position is, according to Soranos, the head presentation with the hands extended along the thighs; after that he puts the complete footling presentation with the hands in the same position, then follows the transverse position, and—as the most unfortunate one —the rather doubtful "Situs duplicatus," which has been explained in different ways, but is probably the breech presentation with extended legs. As a main rule for the treatment of all difficult labours, Soranos insists on the necessity of investigating the reasons for the dystocia, as these occur in the case of the mother, the fœtus, and the genital organs. Among the details, dealt with in the extensive description, we shall only here mention, as far as the mother is concerned, the difficult deliveries of women with small hips—a proof of knowledge

of the narrow pelvis. This also appears among the reasons for difficult labour with reference to the pelvic canal, when he speaks of too firm a connection between the ossa pubis, so that they do not yield during labour; and finally lordosis of the lumbar vertebræ, which gives the uterus a wrong position. With regard to the soft parts of the genital channel, the inclined position of the uterus is mentioned, a much disputed subject after Deventer's time, accumulation of fæcal matter in the rectum, a full bladder; and with respect to the fœtus its abnormal size, its death, and its wrong situation are mentioned as the chief causes.

Beginning with the sensible statement that in a birth case the important object is to save mother and child, but if this be not possible first of all the mother, his leading principle is, in the case of abnormal situations of the child, to correct these—if possible—into the normal head or footling presentation with the arms extended along the sides.

In cases, therefore, where the head has deviated sidewards, forwards or backwards, the anointed hand is put up and corrects the position, but simultaneously the mother's position is varied as a further aid, and, correctly, to the left if the fœtus (body) lies to the right; and *vice versâ*; if the deviation is forwards or backwards, mention is made of a position with the buttocks raised, or knee-elbow position, *à la vache*, a position which is also recommended for very fat women (and which was continued till far into mediæval times). If one hand or both be lying in front of the head the latter is lifted and the hands brought to the sides. In like manner the fœtus is straightened, if the legs be apart, if it is not a complete footling presentation, or if the hands are above the head. The hand is introduced, brings down the feet, and arranges the hands by the sides, and then the result of the birth is looked upon as assured. In like manner the breech presentation is altered—the form of situs duplicatus where the convexity of the fœtus points downwards—to a footling presentation. It is consequently difficult to understand why this is considered more disadvantageous than the transverse position; perhaps he rather meant the other form of situs duplicatus where the convexity is upwards, a fantastical position with both hands and feet above the orificium, which reappears in drawings by Paré and Guillemeau, but on this point Soranos seems rather hard to understand. Finally the transverse position is considered and a distinction is made according to whether the belly, back or sides of the fœtus is foremost. The latter case is considered the most favourable; therefore, if the hand meets either the back or the belly, the fœtus is turned on the side, "for there ample room is available" for the midwife's hand to turn either by the head or by the feet; the former is the better because thus the heavier part comes first, but if the feet are nearest they are taken.

The closing sentences of this section, about the purely manual help in abnormal positions of the fœtus are: "all of this must be done with a quiet, steady hand, so that no contusions occur, and with constant anointing of the genital channel; experience has proved that, by such treatment, during a difficult labour many children have come out alive," a statement showing that Soranos used *podalic version in the case of a living child,* and that his help was humane.

The latter also is shown in his account of embryotomy. If the child is big, dead, or wedged, says Soranos, and, if it does not yield to the pull of the hand, we must make use of more effective means; the object is to save the mother, even if the child perish; and his description of the symptoms the mother often shows in such a case, (such as: fever, inflammation with gangrene, fainting, sweat, chills, small pulse, delirium, and convulsions) corresponds fairly to the last stages of protracted labour, but, he adds, though indicating to those present great danger and slight hope, one must not even in such cases, fail to bring help. These words surely justify the epithet which the church-father Tertullian has given Soranos, namely "The Humane" ("mitior ipse Soranus"), all the more when one considers the view which the men-midwives held later in face of such nearly hopeless cases. We find, as we will later show, traces of Soranos' obstetric teaching in more or less distorted form in the works of the later authors who represent distinct stages in the history of midwifery; but they all appear, as far as this goes, to have abandoned his humane views. "Let him (the accoucheur) go to work and save the mother, who still has strength, but leave to her fate the one whose condition is hopeless" ("deploratam vero relinquat"), Aëtios says (6th century); and "attingi non debet" in Paulos Æginetes (7th century), just as Avicenna (11th century) says: "if she be among the healthy ones, let us then be bold in the treatment, for in the reverse case this is out of the question"; and Rösslin, the first author of a printed special work on midwifery (1513), is in full agreement therewith when he says: if the woman's condition is hopeless, "soll mann Gott lassen walten." Even much later the same reasoning was put forward in as bad a taste; as for instance when Paré's successor in obstetrics in France, Jacques Guillemeau, in the first short exposé of operative obstetrics in his book on surgery (1594) begins by stating that one ought first to study the condition and not touch those who were considered near death, as it would be to run "un grand blasme et deshonneur" should they die in the hands of the surgeon.

In discussing the preparations for the mutilation of the fœtus, Soranos expresses disapprobation of all kinds of succussion, lifting the foot of the bed and letting it drop, tying the woman to a ladder and turning it upside down, or taking her by the armpits, lifting her and shaking her: "One ought to encourage her and explain the treatment as a natural matter." She ought to be placed across a

hard seat with an assistant at each knee; the operator sits in front and somewhat lower. We shall not enter into the detailed description of the technique in connection with the various forms of embryotomy as the main features are the same as employed for centuries: with the sharp and blunt crotchet, knives to open the cranium, a pair of forceps to crush and extract the bones of the head and for brachiotomy and evisceration.

The very uncertain indications then possessed (and long after) to decide whether the child was dead or alive threw an ugly light on these operations. When we except the pulse in some prolapsed extremity or in the navel-string, the operator was in the dark as to the diagnosis of a living fœtus. But in any event, in Soranos' time, and earlier, the operator's conscience was perhaps eased by a curious form of reasoning borrowed from the philosophers, of which Tertullian gives us a hint in statements which also show, in an interesting manner, how greatly the attention of even the outside public was drawn to these violent operations on the part of the surgeons.

In his work "de Anima" in which he laid the foundation of a physiological psychology, Tertullian says of himself, that he has made an excursion into the science of medicine, which he calls the sister of philosophy, and mentions Soranos in two places. In one of these he shows the latter not only as a physician but also as a philosophical author. In chapter vi he speaks of those who endow the soul with certain physical qualities, namely several philosophers and the physician Soranos "the greatest authority in the methodical science of Medicine" ("methodicae medicinae instructissimus auctor"). And further he says: "Soranos, who has written extensively about the soul, and who is well versed in all philosophical doctrines, ascribes to the soul, as we know, a certain physical quality; it is nourished by means of food and enlivened thereby, if it be faint, but hereby he robs it of its immortality, for it is not given to everyone to believe what it is the Christian's part to believe."

But it is particularly in chapter xxv, where Tertullian defends his opinion that the soul enters the body at conception and not at the moment of birth, that he produces the above mentioned curious view of the obstetrics of his day, and that not from the point of view of a physician, which we repeat in his own words: "The soul does not enter the body at birth with the first breath, as the Stoics and certain others (Plato) believe. Experience and medical science prove that the fœtus in the mother's body feels, lives, and consequently has a soul. Answer ye mothers, pregnant and parturient (the unfruitful and men should be silent) whether you feel your child as a foreign body and without life? But some children are still-born; how can that be if they have not also lived? But who are dead? Only such as previously lived. But now there are those who kill the fœtus in the

mother's womb, a cruelty which becomes necessary when in its exit, it is lying across and impedes the birth (cum in exitu obliquatus denegat partum) like a matricide unless it die itself. Thus we find among the surgeons' instruments one whereby the genital organs are violently opened by a turning handle, as well as the ring-shaped knife whereby the limbs inside are cut asunder in anxious expectation, the blunt hook by which the whole mass is extracted, also a bronze spear whereby the manslaughter is done—a hidden robbery with murder—and it is a living child which is killed. This was done by Hippokrates, Asklepiades, Erasistratos and Herophilos, who dissected adults (majorum quoque prosector), as well as the humane Soranos, under the sure conviction that a living being (animal) had been conceived, and out of compassion for the unfortunate child they let it perish beforehand in order that it should not be killed living (ne viva lanietur)."

The closing sentence (which does not differ in older and later texts) is certainly ambiguous and seems senseless, if one cannot be allowed to explain "animal" as a living being though without a soul in opposition to the living, newly-born child. That this, my hypothesis, is not untenable, the following sentence seems to confirm: "Nor does Hikesios, I think, doubt the necessity for this misdeed, as he makes the incorporation of the soul be dependent on the action of the cold air on the newly born."

Whether I am right in this explanation of Tertullian's way of weaving the physician's mutilating operations into his speculations as to the relation of the soul to the fœtus, or in other words therein to discover an excuse for the obstetricians of that period in so far that they were under the impression that they killed a being without "anima" must, however, be left an open question.

Tertullian does not stand alone among the fathers of the church in mentioning Soranos with respect. Somewhere Augustine, discussing the question whether the fœtus can be influenced by impressions received by the parents, relates (contra Julianum Pelagium Lib. V, Cap. 51)—using Soranos' authority—the tale about a Cypriote, mis-shapen king who, in order to obtain a well-made progeny, made his wife look at a beautiful statue during coitus, and he gives him here the title "auctor medicinae nobilissimus."

After this condensed survey of the state of obstetrics, as reached by Soranos, we shall mention the relation between him and the author, who for a long time, and erroneously, was considered his contemporary, and who has the distinction of having left to our generation the only book on midwifery from the days of the Ancients, namely: Moschion.

Not only when Siebold wrote his work on the history of mid-

wifery but even in our day this was still held, though the true connexion—which reduces Moschion to a more modest place in history—is stated, clearly and without admitting of a doubt, not by a writer of medical history but by a philologist, Val. Rose, as already mentioned. Nevertheless, attempts have recently been made to change their relative positions, for instance by Kossmann of Berlin,[1] attempts unfounded on facts, in stating which I chiefly base my opinion on the statements of German and local philologists of eminence.

That Moschion's name—almost forgotten in mediæval times—has been handed down to us is due to Conrad Gesner, of Zürich. This remarkable man—who has been called the German Plinius,—in spite of small means and many hardships, succeeded in becoming a Doctor at Basel, and, in the same year, 1541, was made the city-physician of his native town Zürich. He was a Polyhistor of the first order, whose subjects covered a large field: philology, botany, zoology, and medicine. (In connexion with the first, and as a standing proof thereof, is his "Bibliotheca universalis" (Zürich (1545), a monumental work with references to all the then known Greek and Hebrew writings.)

That Gesner's easily awakened interest also included medicine is not to be wondered at considering that Paracelsus a little earlier, in his country, had excited interest in, and started eager discussion of, medical subjects. And, close by in Basel, Vesalius had stayed at the beginning of 1543 in connexion with the publication of his famous "De humani corporis fabrica" which was to be printed by Oporinus; and he had made use of the occasion to make "an Anatomy" of a beheaded criminal (the rest of the skeleton still exists at the University) though such had not taken place for 12 years. Further, at this period one of the results of the Renaissance was the increasing interest taken in the study of ancient writers in the original, which encouraged the learned to search for old manuscripts in the libraries. That was the case with Gesner, who (in the Augsburg library) found a Greek manuscript of Moschion's book on women's diseases which, however, bore evident traces of being incomplete and altered. He therefore compared it with the Latin text of the same book owned by Thomas Guarinus, a son-in-law of the printer Isengrin of Basel. The Greek text, thus somewhat altered and annotated, was, however, not published by Gesner himself. This was not done till after his death (1565) by Caspar Wolff, his friend and successor who added the abridged but entirely altered preface of Moschion, which explains the reasons for which it was published (but which only existed in the Latin text), and the work was then incorporated among the collection of gynæcological and obstetrical writings, "Gynæcia," which were published at Basel in 1566 and later were followed by

1. In his *Allgemeine Gynaekologie*, 1903.

similar collections by C. Bauhin (Basel, 1586) and Israel Spach (Strassburg, 1597), wherein we again find Moschion's book.

For two centuries no other text existed than this revised Augsburg manuscript of Gesner. In 1793, however, F. O. Dewez published Moschion's book from a Greek manuscript in the Imperial library at Vienna, which was in a better state than that of Gesner; and he added a Latin translation to the Greek text. (A note in the Vienna manuscript proves that it was copied in 1561 at Venice from one existing in the latter place, perhaps the same Greek manuscript which Gesner knew existed in Italy, but which he had tried in vain to obtain.)

Though not without some doubts, Gesner considered his Greek manuscript was Moschion's original. Dewez's better-preserved preface, however, showed that the little book was written for Roman midwives who did not understand Greek; therefore, concludes Dewez, the book was originally written in Latin, and only the Greek translation, from the latest "Greek" period has reached us. Since Gesner's and Dewez's time Moschion's work has thus been to us a Greek catechism of midwifery explaining the knowledge which the midwives ought to possess regarding the construction of the genital canal, pregnancy, and normal birth, also the treatment of many diseases of women—all in close agreement with what existed on this subject in the yet preserved fragments of Soranos, whose importance as an oft-consulted author is further proved in the last chapter but one (151st in Dewez), in which the following is added in connexion with the causes of difficult labour (the weak, or dead fœtus, the little head incapable of dilating the os uteri are mentioned): "These are the causes which I, Moschion, and other old writers have named, but Soranos had added yet others." But the last, the 152nd, chapter, which, according to the heading, ought to deal with the treatment of difficult labour—especially the abnormal position of the fœtus—ends quite briefly and abruptly without entering into the subject, just as all other operative treatment (embryotomy) is left out, probably because this did not concern midwives.

As we have hinted earlier, Gesner already possessed a Latin manuscript of Moschion. Researches in this direction during the last century have proved that not a few of these exist; for instance, Daremberg found one in 1844 in Brussels and later in Florence. But it was the systematic search made by V. Rose in the European libraries which brought to light further copies among which were some of great interest, chiefly as contributions towards our enlightenment of the ancients' knowledge of midwifery and in making clear the relation of Moschion to Soranos. As a result of these researches Rose's work appeared in 1882: "Sorani gynaeciorum vetus translatio latina nunc primum edita, etc." Lipsiae: which is founded on a compilation of three Latin manuscripts existing respectively in Brussels, Florence and Copenhagen: Codex Bruxellensis

(Royal library, Brussels) is the oldest from the 9th to the 10th century; Codex Laurentianus (Laurent. libr., Florence) from the 11th; and Codex Hafniensis (old royal collection, 1653, 4, Copenhagen) from the 12th century. A particular interest is attached to the latter, which Rose found here in 1863, and which we will therefore mention more in detail.[1]

In the "Catalogue of the old MS. collection" in the Great Royal Library (1786) is written with reference to the "Codex Hafniensis"; "a most curious parchment codex with Longobardian letters" (a variis manibus, saec. xii, adds Rose), "containing, among other things: Muscionis, verius Muschionis Gynæcia."

Whence and how this manuscript reached Copenhagen is not stated by the Library, but partly in the text, in the margin, and also on some of the last blank pages and on the inside of the binding are various notes and inscriptions (by either owners or readers), and from these V. Rose—with his great knowledge of the age of manuscripts—makes a guess at its earlier fate. From a prescription on the binding "italica lingua scriptum" (saec. xiv—xv) he concludes that it has been in Italy; at a couple of places in the margin and text stands: "orate pro cencte lowe"; on one of the blank pages: "frater Thomas Glowcetur carmelita," and below "rygt and well" (saec. xvi), all of which points to its having been in English hands. Beyond these surmises nothing further is therefore known with regard to the time it was copied, etc. The manuscript is written on good parchment, the writing is dainty, and the ink excellent.

What, however, distinguishes the "Codex Hafniensis" from the two other manuscripts named, and from later ones, is first of all the author's, Muscio's preface, which contains a line that by carelessness, mistake, or other reason, has been omitted in all of the other manuscripts, and which proves that the book is a compilation and translation of Soranos' works, of which one is translated word for word: "ad integrum tenorem secutus Soranu(m)." Furthermore, reference is made as to the works of Soranos which have been made use of. The contents of the preface is shortly as follows: "In the diseases of women the help of a midwife often becomes a necessity, but none of them is sufficiently versed in Greek to be able to cull knowledge from that literature; and even if she had a Latin handbook she would hardly understand it. I, Muscio, therefore, having already translated sundry works (as instances are mentioned a book on ophthalmics, surgery, therapeutics, probably all from Soranos) have decided to translate this work on women's diseases into Latin and, while making use of the 'Triacontade' (*i.e.*, the '30 books work) I have followed

1. By an unpardonable mistake, in a medical historian, Hergott has given "Hafnia" as "Hanau" in his notes to the French translation of Siebold.

Among the contents shall further be mentioned: Cleopatra, Alfabetum Galieni, Dieta Ypocratis, Dogma Ypocratis, Liber Oribasii, etc.

Soranos word for word. As, however, I discovered that it would become a large work, and that women would tire of reading it, I have resolved to follow the example of the 'Cateperotiana'[1] as to conciseness, in order that I might be able to express all that I wished without making the book too large. But inasmuch as certain chapters were very brief I have also added some from the 'Triacontade,' in order that the subject matter, gathered as it was from all sources, might be sufficient. And it has been my endeavour to express myself in a far simpler manner than the latter; for, to tell the truth, I have used women's expressions, so that even uneducated midwives might easily understand the subject, even when read aloud to them by another."

Muscio's Gynæcia is divided into two parts in the Codex Hafniensis, and the final words in these prove that the contents of the first part is taken from Soranos' Interrogationes (Cateperotiana); but, as these did not contain all that a midwife ought to know, the second part has been supplemented by the description of the gynæcology contained in the Triacontade. This serves to illustrate the difference between the Greek manuscripts (Gesner's and Dewez's) and Rose's, proving, as they do, that not only the preface but also, in several places, the text of the Greek manuscripts are an altered and to some extent mistaken translation of the Latin ones. In this connection we shall only mention this: that Muscio's words in the preface, about the supplementing of the work from the Triacontade ("quodam et triacontados addidi" in Rose's text) in the Greek has become. "I have added 32 chapters(*τριάκοντα δύο χεφάλαια*);" strangely enough one of the points on which Kossmann lately tried to found his contention that the Greek text is the original and the Latin a translation thereof, an opinion which is firmly rejected by prominent German and local philologists who maintain that the contrary is the case.

This also raises the question as to when this author (or translator) Moschion, Muscio (Mustio) lived. In the literature on this subject opinions vary between the 2nd and the 16th centuries; before Rose's work appeared the majority, as also Siebold, put Moschion's period in the reign of Hadrian, in other words as a contemporary of Soranos. It is not unlikely that the reason of this is that he has been mistaken for the Greek physician Moschion, who actually did live about that time, as he is mentioned not only by Soranos (in a chapter on the

1. With regard to the word "Cateperotiana" I am indebted to Prof. J. L. Heiberg for the following: "Cateperotiana" is a bold latinising of Τὰ *κατ' ἐπερώτεσιν* =responsiones or interrogationes.

The libri responsionum, or interrogationes et responsiones which appear in Caelius Aurelianus, a sort of catechism or compendium of the known science of medicine, are taken from Soranos.

anomalies of milk) and by Galen (Kühn, xii, p. 416, in the chapter about Alopecia is mentioned what Asclepiades and "Moschion in libro de ornatu" have said in this connexion).

But who then is Muscio (or Mustio), the author of the Latin translation and remodelling of Soranos, and to which period does he belong?

This can hardly be settled with any certainty; in fact there is no agreement on this point, but the safest authority to follow, Val. Rose, answers the question by saying that the publisher was the African Muscio, probably from the 6th century, or later. The name Muscio, or Mustio, was very common in Roman Africa; and Rose points out that we already know other famous African physicians, as for instance Caelius Aurelianus and Cassius Felix, as interpreters of Greek writings; but nothing of a precise nature is known with regard to Muscio. According to other guesses (Steinschneider, quoted by Haeser) the name Moschion is thought to be of Hebrew origin synonymous with Moses, pronounced "Mosche," and turned into Latin or Greek as "Moschio"—"Moschion." It may therefore be possible that later Greek translators of Muscio's Latin text may have changed the name to Moschion, but there is no proof of this.

The Codex Hafniensis, however, has another very interesting point, besides giving us the key to the understanding of the relations between Muscio and Soranos, inasmuch as, in the part dealing with the various positions of the fœtus in utero, and the manner of treatment, pictures of these positions, 15 altogether, are found. These are of considerable interest, being—as we shall show later—the prototype of much later pictures of the same subject in the earliest printed book on obstetrics.

But, before saying anything further with regard to these pictures, we shall refer to a manuscript picture which has been and still is the subject of a strange misconception. Following on the preface, the Codex Hafniensis begins with a description of the different parts of the uterus, saying: "In order to understand this better, I will draw it and put letters to indicate its several parts" ("volui eam impingere et in singulis partibus ejus singulas litteras adponere"). Then follows, on the first page, an empty space which has evidently been meant to contain the description of the parts to which the letters A to G refer.

In the Greek texts by Gesner and Dewez (in other words respectively from 1566 and 1793) is found, however, in this place a picture of the uterus (Fig. 1) with no source stated, but provided with letters corresponding to the text which therefore may easily have led one to believe that they existed in the Greek manuscripts, and be due to Moschion—a mistake which even as able a bibliographer as Choulant was guilty of, and besides him not a few others: Haeser,

Fig. 6. Codex Hafniensis. Saec. xii (Partus 9–12).

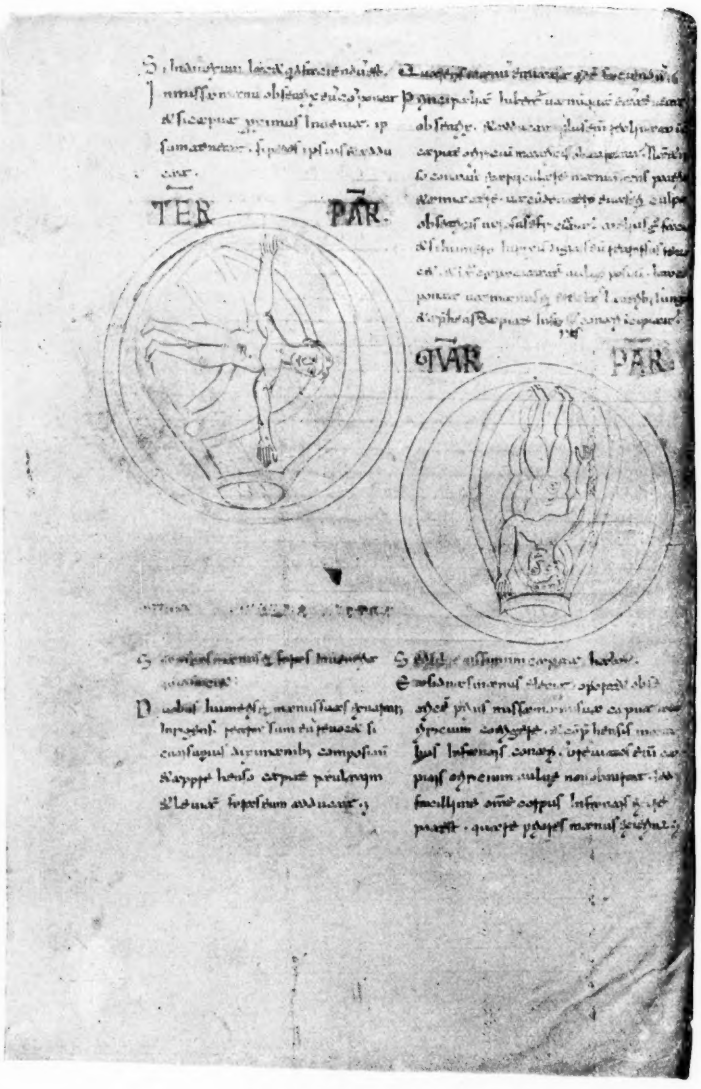

Fig. 4. Codex Hafniensis. Saec. xii (Partus 3–4).

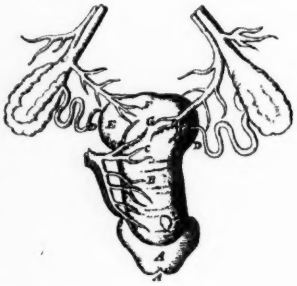

Fig. 1. Uterus. Illustration by Gesner and Dewez (after Vesalius).

Fig. 2. Maunser. Illustration of the Uterus (Cod. Bruxell., 9th century, after Kössmann).

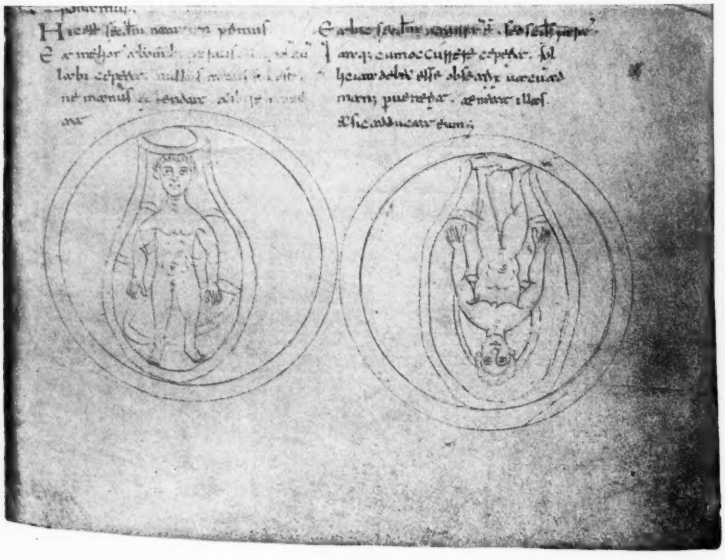

Fig. 3. Codex Hafniensis. Saec. xii (Partus 1–2).

Puschmann and even Rob. Fuchs,[1] while Ploss[2] attributes the picture to the man who, in the 15th century (?), translated Moschion's Latin work into Greek.

It is, however, now conclusively proved that the drawing does not date from Greek manuscripts, with whose descriptions moreover it does not agree, but that it is taken from Vesalius being found in his "Epitome," in the adnex or compendium, chiefly written for beginners (1543), as well as in his chief work "Fabrica."[3]

The explanation we imagine, therefore, is that Gesner, or C. Wolff, in common with the established practice of stealing Vesalius's drawings, has taken the picture from the said source (without referring thereto), altered the letters after Moschion's text, and then that Dewez has copied them.

The empty space in the "Codex Hafniensis"—where the drawing of the uterus ought to have been—is probably accounted for by the carelessness of the copyist; this is still further proved by the actual existence of such a drawing in one of the Latin manuscripts of Muscio's work and moreover the oldest one hitherto known, namely the "Codex Bruxellensis." It is reproduced on a reduced scale by Kossmann, who got a tracing of it from Brussels and it is, we believe, the oldest known drawing of the uterus (Fig. 2). Recently Dr. Weindler,[4] of Dresden, has reproduced the above-mentioned page in the Codex Bruxellensis, with the text and drawing of the uterus, according to the scale of the original.

But, while in the Copenhagen Codex the space where the uterus has been drawn thus remains vacant, the 15 drawings, already referred to, of the various situations of the fœtus, are found in the chapter on difficult labour in the 2nd part; these did not occur in Gesner's and Dewez's Greek manuscripts, and when Rose wrote his book, it was the only manuscript in which such were known to exist.

Facsimiles of the pages referred to (in the manuscript) are given here (Figs. 3—7)—drawings as well as text[5]; and Rose's version of the latter, compared with the Codex Palatinus (which is to be mentioned later) and the Codex Bruxellensis, is given immediately below.

After my publication in 1906 of the illustrations in the Codex Hafniensis, the manuscript was sent to Leipzig and has been studied by Prof. Sudhoff, who, in his paper "Studien z. Gesch. d.

1. *Deut. med. Wochenschr.*, 1898, No. 1.

2. *Das Weib*, etc., 1883, I.

3. In the latter at the end of the 3rd book on the plate showing veins and arteries, in the 1543 and 1555 edition; in the Epitome on fig. vi. of the last plate, Boerhaave's edit. with text: "Uterum cum testibus seminalibusque vasis proponens."

4. *Gesch. der gynaek. anatom. Abbild.*, 1908.

5. At Partus 1-2 the uterus is wrongly placed with the os externum upwards, probably a mistake on the part of the copyist. With regard to the text it has been omitted before Partus 13-14 (Situs duplic. and twins); the slightly yellow and buckled parchment partly accounts for the difficulty in reproducing the pages.

Medizin," 1 H., 1907, has reproduced some of the illustrations, which likewise has been done later, 1908, by Dr. Weindler of Dresden.

(Rose): ad *1*. Hic est secundam naturam primus et melior ab omnibus partus. Et quidem cum labi coeperit, nullus metus subest ne manus extendat et ibi remaneat.—*2*. Et. hic secundum naturam est, sed secundus partus. Itaque cum occurrere coeperit, sollicita debet esse obstetrix ut cum ad manus pervenerit, teneat illas et sic adducat eum.—*3*. Si in divexum jacet, quid faciendum est? inmissa manu obstetrix eum componat, et si caput proximum invenit, ipsum teneat, si pedes ipsius, et aducat.—*4*. Quotiens manum mittit, obstetrix quid facere debet? principaliter jubetur ut numquam eum obstetrix teneat et conetur adducere, plus enim reclinato intus capite orificium matricis obturatur, nam ipso conatu exarticulare manum infantis poterit et amittere, ut cum de utero evaserit, culpa obstetricis vitiosus efficiatur, melius ergo faciet si humero ejus infixis digitis eum retrorsum revocet et intra capacitatem vulvæ positum ita componat ut manus ejus erectas lateribus ipsius jungat et adprehenso capite in foris conari incipiat.—*5*. Si ambas manus ejus foras invenerit, quid facere debet? Duobus humeris ejus manum suam ex utraque infigens, retrorsum eum revocet et sicut superius dixi manibus compositis et adprehenso capite paulatim et leniter eum foris adducat.—*6*. Sed si brevissimum caput habeat et ambas manus foras eiecerit, oportet obstetricem prius missa manu sua caput infantis ad orificium corrigere et comprehensis manibus infantis conari. Nam si brevitas capitis orificium vulvae non obturat, inde eiciendus est per quam priores manus exierint.—*7*. Si in pedibus descendens in aliquam partem vulvae relicum corpus inclinaverit, quid facere debemus? Sicuti retrorsus dixi, obstetrix missa manu sua, eum componat et sic adducat foris.—*8*. Et si unum pedem foris eiecerit? jubemus ut numquam eum obstetrix teneat et conetur adducere, ne reliquo corpore infantis plus claudatur, sed prius infixis digitis ad inguina infantis sursum eum revocet et post inmissa manu sua pedem alterum corrigat et si fieri potest manus ejus lateribus jungat, et adprehensis pedibus foris adducere conetur.—*9*. Si ambos pedes foris eiecerit et manus super caput contortas habuerit, quid faciemus? duobus manibus suis obstetrix inguinibus infixis, in sursum eum repellat et compositum sicut dixi foras eiciat.—*10*. Si divisis pedibus duobus partibus vulvae plantas infigat? inmissa manu sua obstetrix eos jungat et ad orificium matricis componat et sic eos foris adducat.—*11*. Si genua ostenderit et sic exire conatus fuerit, quid faciemus? retrorsus repellendus est et correctis pedibus sic adducendus est foris.—*12*. Si vero in naticas sedet? obstetrix manum infigat et retro infantem repellat et correctis manibus ac pedibus adducat.—*13*. Si duplicatus fuerit, quid faciemus? volo duobus modis pecus in vulva duplicari (quotiens enim naticas ejus in orificio invenimus, ex inferiori parte fiet duplicatio, quotiens autem caput et plantae in orificio inveniuntur, ex superioribus facta est duplicatio. Et potest obstetrix ita corrigere ut plantis in sursum revocatis et pedibus correctis caput hic teneat et sic infantem foras adducat.—*14*. Et si plures ab uno fuerint, tres vel quatuor, ut aliquando solet evenire, et simul omnes se ad orificium contulerint ut in unum pariter exire conentur, quid faciemus? Sicut superius frequenter dixi inmissa manu sua obstetrix omnes in sinum vulvae repellat, et sic singullatim eiciendi sunt.—*15*. Si in divexum jacet, quid facere oportet? si supinus vel ad dentes est, leniter inmissis digitis in latus eum convertat, ut accepto spatio manum suam obstetrix mittere possit, ut eum facillime in integro schemate componat et quascunque partes proximas ad orificium habuerit, ipsas teneat et sic adducat. Ita tamen ut maxime caput infantis quaereat et ipsum teneat. Si quidem ab omnibus melior descensus per caput invenitur. Sed si pedes fuerint proximiores ipsas adprehendat et sic adducere conetur.

Gyn. Staff Room University Hospital.

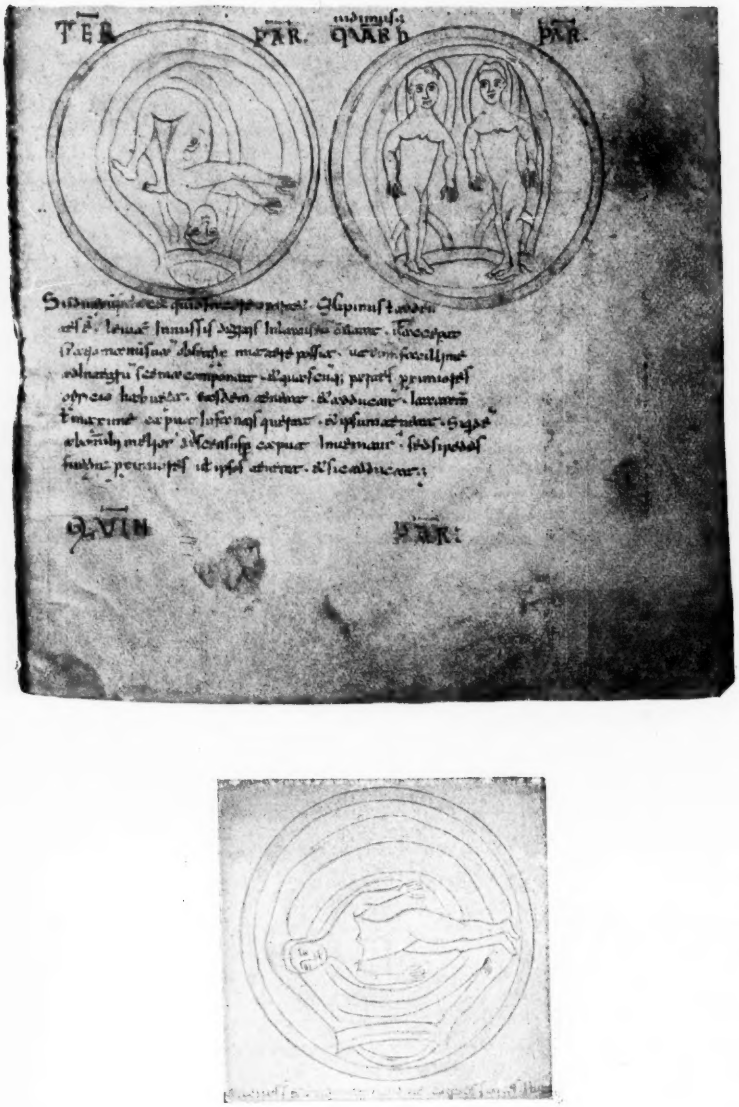

Fig. 7. Codex Hafniensis. Saec. xii (Partus 13–15).

Fig. 5. Codex Hafniensis. Saec. xii (Partus 5–8).

The fundamental principle underlying these rules with respect to the treatment of the various positions of the fœtus is the undoubted advantage of the head presentation, then follows the footling presentation which also is considered as a natural form of birth. In both cases the necessity of keeping the arms close to the side of the fœtus during its passage is pointed out. In two places, oddly enough, the transverse position[1] is repeated, namely in partus 3 and 15 (with, respectively, the arms extended and close to the body); the accompanying text in the former mentions cephalic version as advisable, but, if the feet are nearer, podalic version is preferred. At partus 15 is put the rule that if, in the case of transverse position, the back is forewards ("supinus") or the belly ("ad dentes"), the body is turned on the side, so that the hand can get up to perform cephalic or podalic version. It is a complete misconception of the expression "ad dentes" to give Moschion credit for knowing "the face presentation" as, for instance, v. Winckel has done.[2]

At figs. 4, 5, 6, advice is given against pulling the arms in case they should be found resting against the head, the head would, by so doing, become more firmly wedged, or the child might suffer some injury; but the body should be pushed up by pressure on the shoulder, the arms are then placed along the sides of the trunk, and the head is brought down. In 7—10 rules are given for the footling presentation. When one foot only presents this must not be pulled on, but the midwife presses her fingers against the groin, the child is pushed up, and the second leg pulled down, the arms are placed against the sides, and both feet are seized. The same is done in the case of complete footling presentation, of such with legs apart (10), knee, and breech presentation (11-12). The fear which Soranos thus has with regard to seizing one leg appears on this point to place him at a disadvantage as compared with Celsus, in so far as the latter mentions extraction by "the foot." Soranos' description of the two forms of "situs duplicatus" probably refers to the breech presentation with extended legs, or the presentation of the head together with both feet; the drawing, fig. 13, most likely applies to the latter, but is rather fantastic. Finally, in fig. 14, twin and triplet cases are dealt with, and the midwife is asked to bear in mind the prevention of the simultaneous exit of two or more children and to see that each is born separately.

1. With regard to the expression "in divexum" (in Soranos' Greek text "πλαγιος" *i.e.*, "transverse") used in both places, it must, according to Prof. Heiberg, be an error made by the copyist reading "in divexum" instead of "in diversum," which means "transverse"; "in divisum" (Codex Monacensis) is another mistake in reading, giving no sense. In a Muscio manuscript of English origin and in a Dresden MS., which we shall mention later, it is written "in diversum."

2. In the historical preface to his treatise on Midwifery, 1893, and again in *Handbuch d. Geburtshilfe*, 1903.

That these drawings in the Codex Hafniensis are copies, or imitations of the originals in Soranos, can hardly be doubted. In the two other manuscripts (the older Codex Bruxellensis and Codex Laurentianus) employed by Rose, these drawings were not discovered, this, however, according to him, is only due to careless copying, for lines were drawn where they ought to have been found. (That it, strangely enough, has escaped Rose's notice that the "Birth Figures" nevertheless did exist in some other pages of the Codex Bruxellensis, will be referred to later). And finally, in the original Greek manuscript by Soranos (Cod. Parisiensis. 2153, found by Dietz), the note is made by the copyist that drawings existed of the several positions of the fœtus in utero, together with an explanation, but that these were omitted owing to their complicated nature. (That Soranos also, in another place, has made use of illustrations, would seem to be confirmed by the paper "on bandages" found under Soranos' name, and furnished with 27 illustrations, in the famous Florentine MS. (Codex Laurentianus, lxxiv, 7), of whose publication Prof. Schöne (Königsberg) raised hopes in 1896, but which has not yet appeared. (It may, however, possibly be done soon by Prof. Ilberg (Leipzig) when he publishes his new edition of Soranos.)

At the time when Rose had completed his work, therefore, he only knew the drawings in the Codex Hafniensis, but before the publication thereof he saw (1881) in the Bibliotheca Apostolica (the Vatican) a manuscript of Muscio dating from the 13th century "more elegant but less correctly written than that of Copenhagen," and in this were 16 drawings of the positions of the fœtus. This "Codex Palatinus" originally belonged to the Heidelberg Library. After Tilly's conquest of Heidelberg, during the 30 years' war, September, 1622, the Duke Maximilian of Bavaria presented the costly collection of books to Pope Gregory the XVth. For long the Popes, following Sixtus the Vth's example, had endeavoured to add to the libraries of the Vatican, and they especially had kept their eyes on the Heidelberg collection, whose chief treasures were illustrated manuscripts of Virgil and Terence. The treasure was therefore hurried to Rome, and in the beginning of 1623 a string of mules carried it over the Alps. In 1817 part of it was returned, mostly ancient German manuscripts.[1] We shall later on mention the analogy existing with regard to the drawings as well as the text between the first printed book on Obstetrics by Eucharius Rösslin and Muscio's Latin version of Soranos. It is of interest to note in this connexion that this illustrated Codex existed in adjacent Heidelberg when Rösslin's book was published at Worms in 1513.

During his stay in Rome, in 1902, Prof. G. Klein (Munich) obtained photographic reproductions of the illustrations in the Codex

1. Fr. Wilken, *Gesch. der Bildung, Beraubung, Vernichtung d. alten Heidelberger Büchersammlung*, Heidelb., 1817.

Fig. 12. Codex Monacensis. Saec. xiii–xiv (Partus 1–6).

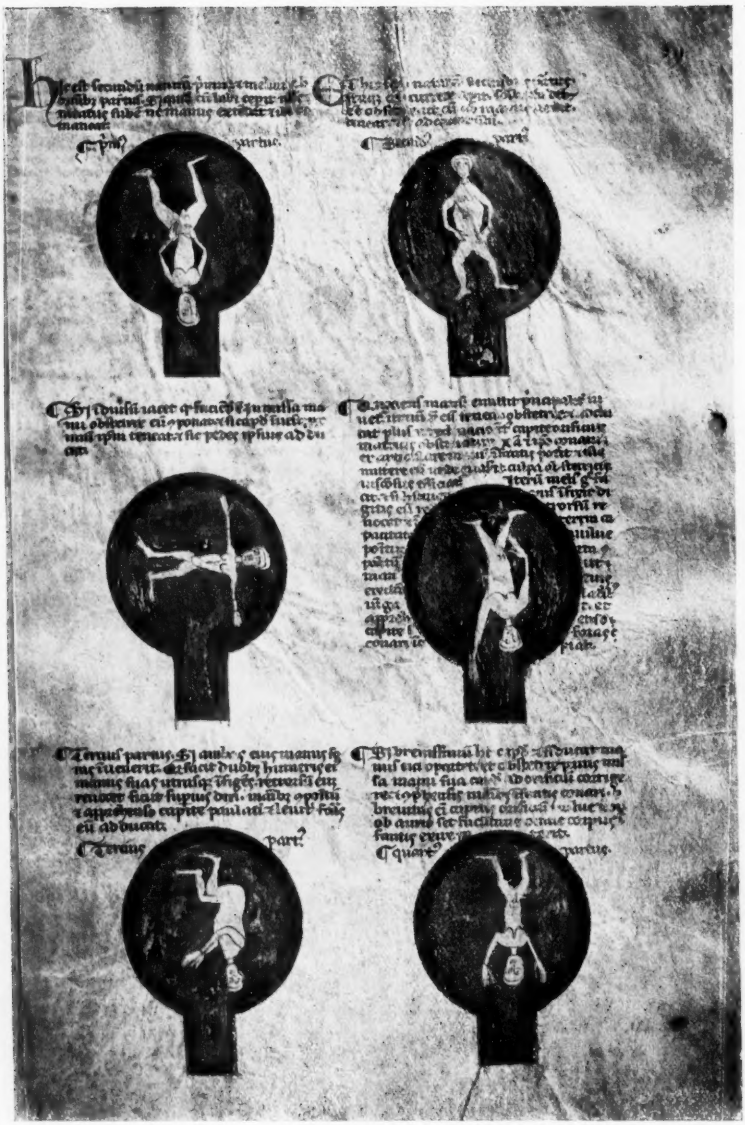

Fig. 11. Codex Monacensis. Saec. xiii–xiv (Partus 1–6).

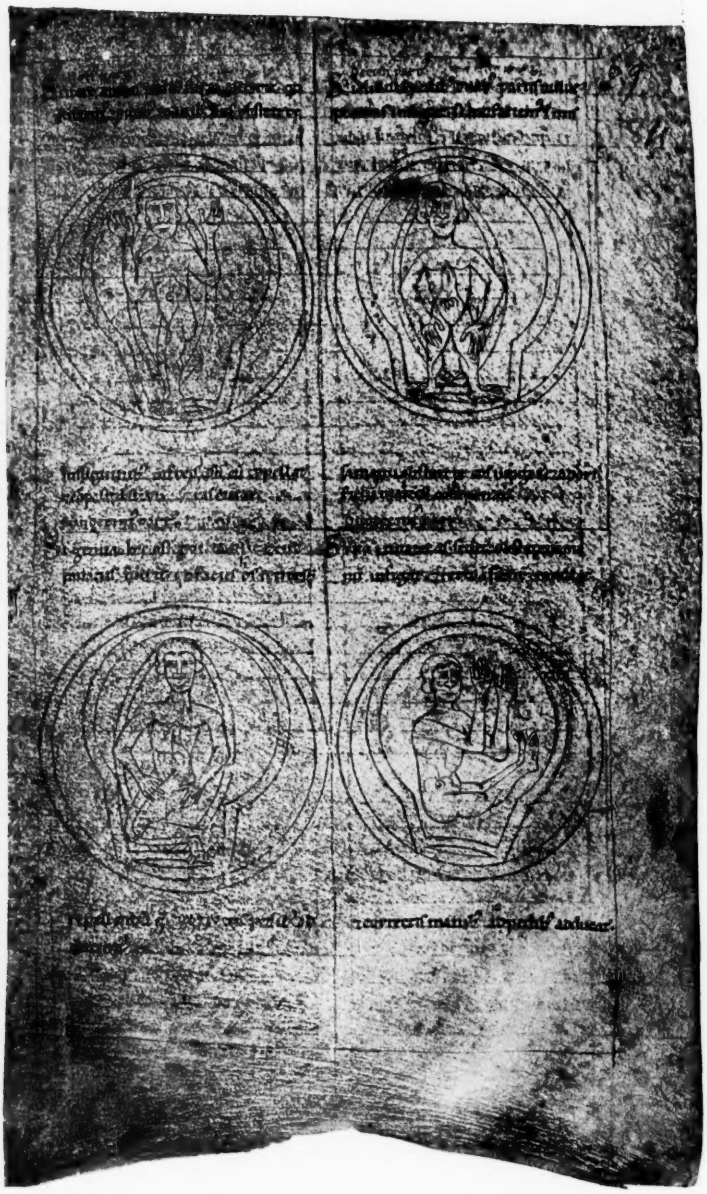

Fig. 9. Codex Palatinus. Saec. xiii (Partus 9–12).

Fig. 8. Codex Palatinus. Saec. xiii (Partus 5–8).

Palatinus. He made use of these in connexion with his lectures, but did not publish them. Through Padre Ehrle's (director of the Vatican Library) kindness, I obtained, in 1905, similar photographs, and have published them in part in 1906 in my previously-mentioned Danish work. I now reproduce them here. (Figs. 8—10.)

Rose concludes his work (1882) by mentioning the faint traces of Soranos' teachings known in mediæval literature up to Rösslin's time as found in the Latin translation and revision by Muscio; and he mentions as such a Florentine manuscript from the 11th century, a barbaric compilation in 6 volumes in which Muscio's name occurs, just as his "Gynæcia" is mentioned in the 13th century in a large pharmacological work by Simon from Genoa (Januensis), Pope Nicolaus' physician. Finally, Muscio is mentioned in a German work on women's diseases by the Bavarian Duke Sigismund's physician (1760—67), Joh. Hartlieb, dedicated to the Emperor Frederic III, and even his illustrations of the positions of the fœtus are dwelt on; but beyond this in the text of the German Berlin manuscript no mention is made at all of Muscio, according to Rose.

But the assumption that in several of the libraries of Europe more of these illustrated descriptions of the science of midwifery were to be found has now been fully confirmed in the interval which has elapsed since the publication of Rose's work.

Thus Prof. G. Klein, Munich, learnt, in 1901, through Dr. Boll, the secretary of the Royal Library of Munich, of the existence of a Latin Muscio manuscript, in the said library, dating from the 13th to 14th century, and containing illustrations which were mentioned by Klein at the 9th German Gynæcological Congress (1901) at Giessen.[1] I am indebted to Dr. Aumer (the chief librarian at Munich) for having supplied me with photographic fragments of this manuscript, which are reproduced here. (Figs. 11—12.)

By a chance circumstance, I personally received further confirmation that more illustrations might appear. While searching for a manuscript of Henrik Harpestreng in the Thott collection of our Royal Library the number in the catalogue proved wrong, and the

1. The fact that the manuscript escaped the attention of Rose and has remained unnoticed so long is easily explained, as it is entered in the catalogue (Cat. codic. latinor. Bibl. reg. Monacens., Ed. altera, T. I., pars. 1, 1892, p. 36) without name, and only as a fragment found among other medical works. Under No. 161 is stated: "Cod. membr. saec. xiii, in Italia scripta, 78 fol."; the contents is: pieces of Albulkasem, Hippokrates' Aphorisms, Rogers surgery, etc.; on page 39 begins: "de variis modis partus cum figuris," but on page 40b follows a new treatise "de cibis vulneratorum," all that there is of Muscio therefore evidently consists of only 3 pages with the 16 drawings of the foetus plus the text applying thereto. In the catalogue is quoted the first words of the text on p. 1; "hic est secundam naturam primus et melior ab omnibus partus" (s. ante p. 18) which clearly enough proves the author (in the first edition of the catalogue, 1868, the fragment is not mentioned at all).

manuscript handed to me was a parchment codex which, according to the catalogue, dated from the 15th (or 14th) century, and contained a description of medicinal plants, a herb-book, partly in French and partly in Latin, with rather coarsely coloured drawings, about one on each page. The manuscript is mentioned in the printed catalogue of the collection (1795) as: "Mayfredus de monte imperiali, de viribus herbarum et aliarum specierum medicinalium." A find of extraordinary interest was then discovered. The first 5 pages are blank, but on the 6th is found in a frame which nearly recalls the byzantine frame round the surgical illustrations by Apollonios from Kitium (see fig. 14) in the curious Florentine manuscript, Codex Laurentianus, lxxiv, 7, 8 miniatures, which plainly prove to be reproductions of the various positions of the fœtus in utero, very similar to those found in the Codex Monacensis. Much decorative skill has been applied in the execution, the colours are red, blue and gold, but several of the pictures have faded under the influence of time. (The three clearest are reproduced here in Fig. 13.) No accompanying text exists; there is apparently no connexion between them and the rest of the contents of the manuscript. On the 8th page the register of the names of the plants begins; but the blank leaves would appear to indicate that a list of contents was intended to be put there. That these pictures of the fœtus are an appendix to the herb-book with which it has no connexion whatever, has further been proved by Prof. Sudhoff. The manuscript has (after I had described and partly reproduced the pictures in my Danish work, 1906) been studied in Leipzig by Sudhoff, who has correctly shown[1] that the parchment referred to has originally been larger, but has been cut down in order to fit better into the herb-book; and, with his great knowledge of manuscript miniatures, Sudhoff holds that these belong to the 12th century.[2] This accidental find seems to indicate that several of these obstetrical illustrations have existed, and during the mediæval period have passed from one manuscript to another.

Thus Prof. Sudhoff's endeavours to add to the number of these "Birth Figures" have recently borne surprising fruit. As a substitute for the "Leipziger Codex, 1192," found by him (and described in "Studien" (l.c.)), from which the pictures had been stolen, he found in the Royal Library of Munich a manuscript (Cod. monac. germ., 597) from 1485, in two pages of whose last and surgical section are reproduced the 16 "Birth Figures" in a fantastic framing of egg-membranes and with the well-known signature. The find is

1. *Studien z. Gesch. d. Medizin*, Heft I, 1907.

2. This manuscript from our Royal Library has recently been sent to Dr. Weindler, of Dresden, who in his work "*Geschichte d. gynaekol. anatom. Abbildungen*," 1908, reproduces the eight miniatures in colour, and mentions in his description of them, that their discovery was due to mere chance, but does not see fit to mention my name in connection with the discovery.

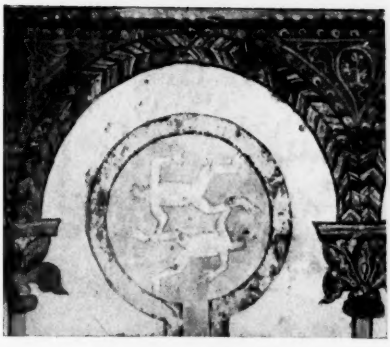

Fig. 13. Thott's Collect. 190 Fol. Saec. xii.

Fig. 14. Codex Laurentianus lxxiv, 7.
(Apollon. fr. Kitium.)
Reposition of the luxated lower jaw.

Fig. 17. Codex Bruxellensis, Saec. ix.
(After Südhoff.)

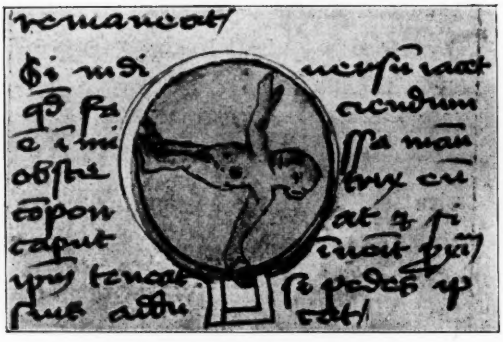

Fig. 18. Codex "P. 34," Dresden,
Herm. Heym, 1450–60.
(After Weindler.)

Fig. 15. Codex monac. germ. 597, Saec. xv.
Royal Library of Munich.
(After Südhoff.)

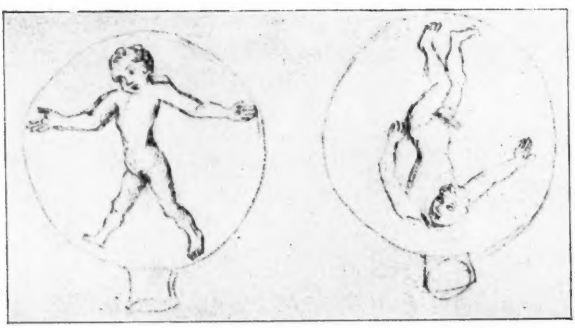

Fig. 16. Codex latin. 7056, Saec. xiii.
Bibl. nationale, Paris.
(After Südhoff.)

Fig. 10. Codex Palatinus. Saec. xiii (Partus 13–16).

described in 1908[1] One of the illustrations I have reproduced in Fig. 15. But still more interesting discoveries have recently[2] been published by Sudhoff. In the Codex Latinus, 7056, from the 13th century, in the National Library, Paris, follows after "Anathomia Ricardi Anglici" and some papers by Master Roger on page 775 "Summa quae dicitur trotula," and therein on pages 86—93: "genecia cleopatrae ad deodatam," on these pages 16 "Birth Figures" are reproduced at the bottom (unfortunately, says Sudhoff, a dirty mind has at a later period damaged the figures by an obscene representation of the genital organs). In Fig. 16 I reproduce a couple of these figures. By far the greatest interest, however, is attached to Sudhoff's discovery of "Birth Figures" in the well-known "Codex Bruxellensis," 3701—3714 from the 9th century, from which we—as already mentioned—have the earliest known picture of the uterus (see Fig. 2) which Kossmann was the first to publish. Curiously enough it has escaped Rose's (and Kossmann's) notice that the manuscript on pages 26—29 contains 12 illustrations, the "Birth Figures," all of which Sudhoff reproduces. The bottle-shaped uterus with the two ear-shaped prolongations at the corners (appendices) are repeated in all the figures; but, strangely enough, Partus III, which in other Muscio manuscripts shows us the transverse presentation, here represents a case of triplets where two of the children are lying transversely (see Fig. 17); and very quaint is the 13th figure, which must be due to a whim of the draftsman, showing, as it does, a uterus with 9 boys and a couple more at the corners (!) The great interest in these pictures, therefore, is that, by their means, we have reached as far back as the 9th century—as Sudhoff says not so very far (only 2—3 centuries) from the publication of Muscio's Latin Catechismus for Midwives, which again undoubtedly has Soranos as its source.

In connection with these interesting finds of Sudhoff's, I still wish to mention that illustrated Muscio MS. which Dr. Weindler, of Dresden, has recently described.[3] It is found in a paper Codex in the Royal Library of Dresden, and was written and illustrated in the years 1450—60 by Herm. Heym, the city-physician of Rotenburg. (A single picture—the transverse position—is reproduced in Fig. 18).

As our "Codex Hafniensis" bore traces of having been in English hands, I will draw attention to some traces of Muscio manuscripts which, without being recognized as such, may be found on British soil or have a British origin. My acquaintance with the first I owe to a written communication (28/3/1905) from Val. Rose. In the 1878 catalogue of the Bodleian library's manuscripts[4] is found: Cod. Rawlinson 671, Saec. xiii, "Genetia Imitionis (!) doctissimi viri," but the first lines of the manu-

1. *Archiv. f. Gesch. d. Medizin*, Bd. I. H. 3-4.
2. *Stud. z. Gesch. d. Med.*, H. 4, 1908.
3. *Gesch. d. gynaekol. anatom. Abbildungen*, 1908.
4. Cat. cod. manuscript Bibl. Bodl., P. V., Fasc. II., Oxon., 1878, page 342.

script are quoted: "Cum nobis frequentius in mulieribus (!) causis obstetrix fuisset necessaria" which plainly enough shows that "Imitionis" is a corruption (or possible rather an error of reading or writing) of "Mustionis." The catalogue says nothing about any illustrations, and, according to a communication to me from the library (9/10/1908) none exist. But in the Ashmolean manuscript, No. 399 (13th century)—also in the Bodleian Library—there is a "Tractatus obstetricius de forma uteri et foetus in eo posicionibus diversis," and therein 10 "Birth Figures" which assuredly also are related to the Muscio illustrations, but the library has reserved to itself the reproduction of these figures.

In the "Sloan MS. 2463," in the British Museum, described by Aveling,[1] and whose author is unknown, but whose contents—according to Aveling—show great similarity to Roger of Parma, the text also is accompanied by "Birth Figures." Not only the number —16—also found in this instance, but the order of the illustrations point in my opinion—in spite of the very fantastic positions of the pictures—decidedly to the originals in the Muscio manuscripts, even though the English text is in no close agreement with the latter.

Such an agreement is, on the contrary, found in the Latin parchment manuscript from the 15th century called: "Practica Magistri Johannis Arderni de Newark" in the Royal Library of Stockholm. This has been described in 1899[2] by Dr. Alin, of Stockholm, who, according to the librarian Wieselgren, expresses the opinion that it reached Sweden through the English Queen Philippa, who in the beginning of the 15th century was married to King Eric of the United Northern Kingdoms. John Ardern worked as a physician in Newark from 1370 and later in London. His literary legacy is extensive, sundry manuscripts, partly in English and partly in Latin, exist in the British Museum and elsewhere. Special interest is attached to the Stockholm manuscript, inasmuch as it contains an obstetrical section: "De pregnantibus et de partu," which, according to Alin's researches, is not the case with other manuscripts by John Ardern. Alin reproduces the part which deals with the irregular situations of the fœtus and their treatment, which is accompanied by illustrations, "Birth Figures," but we then see that these as well as the text are true copies of Muscio and not original work by John Ardern. As a typical illustration I have reproduced Partus III—the transverse position (Fig. 19)—where the manuscript adopts the correct orthography "diversum" as opposed to "divexum" in the Codex Hafniensis and "divisum" in Codex Monacensis.

Continued research will doubtless result in the discovery of still more of these illustrated Muscio manuscripts. Those already found, however, prove that they have been spread all over Europe, and that

1. *Obstetr. Journ. of Gr. Britain*, April, 1874.
2. *Nordisk med. Arkiv.*, 1899, No. 2.

Fig. 19. "Practica," Joh. Arderni, Saec. xv.
Royal Library of Stockholm.

they have played an important part in mediæval literature, and we cannot therefore wonder at finding traces of them in the earliest printed books.

As will be seen, the illustrations in the Codex Palatinus remind one very much of the Codex Hafniensis as far as the execution and the pictures of the uterus. The last (16th) figure in the Codex Palatinus is a twin birth with a head and footling presentation. The twins both stretch their hands towards one another but do not actually grip. The same is the case in the two pictures of twins in the Codex Monacensis. There is here, as elsewhere, an attempt at the curious representation of twins holding each other round the foot as first done by Rösslin and later by Paré and Guillemeau, which seems to point to the Biblical legend about Esau and Jacob's birth (Genesis, chap. xxv, 24—26). In the Thott manuscript, as will be observed, this representation has been generally adopted in the case of twins placed in a transverse position. Whether this is an original idea on the part of the artist or whether it is to be traced back to the oldest manuscript, and occurred in the originals in Soranos cannot be decided, but is hardly likely. In the oldest illustrated Muscio MS. hitherto known (Codex Bruxellensis) no twin picture was found, and, as Sudhoff correctly remarks, the twin case is, strictly speaking, mentioned neither by Muscio nor by Soranos. The former only says: "et si plures ab uno fuerint, tres vel quatuor. . . ."

In closing the description of Soranos' obstetrics as found in these illustrated Muscio manuscripts, I desire finally to quote the possibly bold yet interesting hypothesis with regard to the "Birth Figures" which Sudhoff mentions at the end of his last work[1] on this subject, and which he formulates thus: "Perhaps some constructive mind on the shores of the Nile has sketched these birth figures on a papyrus scroll from the description of a Greek or Egyptian midwife." For, in the Greek Soranos MS. (Parisinus graecus 2153) the following note has been added to the copyist's remark (s. ante p. 20) that he has omitted the birth figures: *γυναικεῖος ὑποζώγραφος ὀλυμπιάδος ἡρακλείας διαπεμπομένης πρὸς χλεοπάτραν βασίλισσαν αἰγύπτου.*

\+ *σωρανός*: ⏑– +

Without seeing an actual proof in these words Sudhoff thinks "that they point back to Alexandria—to a female artist in the service of the Egyptian queen, Olympias, as the first author of these birth figures. Whether, therefore, it is Cleopatra, or Soranos—who lived 120—150 years later—who has made use of the brush for scientific illustrations is of minor importance."

In connection with the above quoted Greek note I desire, however, to remark that eminent philologists like Prof. J. L. Heiberg (Copenhagen) and Prof. Ilberg (Leipzig) declare that the wording appears obscure and unintelligible to them.

(To be continued.)

1. *Studien*, etc., 3-4 H., 1908.

The Bacteria of the Puerperal Uterus, with Especial Reference to the Presence of Hæmolytic Streptococci.*

BY

ARNOLD W. W. LEA, M.D., B.S., F.R.C.S.,
Lecturer on Obstetrics, University of Manchester,

AND

E. J. SIDEBOTHAM, M.A., M.B., M.R.C.S.,
Lecturer on Bacteriology, University of Manchester,

THE problems presented by the relation of the streptococcus pyogenes to puerperal infection have been the subject of many investigations during the last few years. This organism is undoubtedly the cause of the great majority of cases of severe infection, and is usually found in abundance in the uterine discharges. It is, however, not infrequently present in the vagina and in the uterine secretion after delivery in cases pursuing a normal course. The streptococcus has also often been found in the slighter forms of infection which are clinically regarded as being of sapræmic origin. It is, therefore, of great importance to determine whether the streptococci found in severe forms of infection are essentially different from the saprophytic types of the organism or not. The remarkable variations in the infective power of streptococci have lead to many attempts to classify the various types with the object of bringing their morphological and cultural features into relation to their pathogenic power. Efforts have been made to detect specific differences between varieties of streptococci according to the length of their chains, their mode of growth and staining reactions, their power of agglutination and their virulence for animals. None of these features, however, have been found to be constant. The results of recent experiments on immunisation of animals carried out by Natvig, Zangemeister and Meissl appear to show that all facultative anaerobic streptococci are essentially of one stock. Scheib, who has closely investigated this question, states that it is impossible to distinguish between streptococci existing as saprophytes in the lochial discharge and those causing puerperal infection. During the last few years great stress has been laid upon the hæmolytic power of streptococci as an indication of their virulence, and it is to the solution of this question that our observations have been mainly directed. Before considering our results in detail it may be

* Read at the meeting of the Obstetrical and Gynæcological Section, Royal Society of Medicine, December 9th, 1908.

desirable to review briefly the present-day knowledge of the organisms found in the vaginal secretion and in the lochial discharge of healthy individuals.

The Vagina. An enormous amount of research has been devoted to the investigation of the vaginal secretion in healthy women during pregnancy with the object of determining the presence or otherwise of organisms capable of producing infection. Microscopic examination of the secretion reveals the presence of many organisms, but accurate information can only be obtained by cultural methods, and for this purpose it is essential to remove the vaginal secretion without any contamination from the vulva. This may be carried out by separation of the labia, and the introduction of a platinum wire loop into the vagina, great care being taken to avoid contact with the vulva. Many observers have used a speculum. This, however, appears to be inadvisable, as it almost inevitably results in the introduction of organisms from without. A method which is probably the least open to objection consists in the introduction of a tube as first adopted by Krönig and Menge.

The earlier observers, such as Gonner, Winter, and others, found many bacilli and cocci in the vaginal secretion; these were mainly anaerobic in type and were not pathogenic for animals. Döderlein, in 1892, published his classical paper, based upon the examination of the vaginal secretion of 195 pregnant women. He described two forms of secretion as existing in pregnancy.

In the normal condition the vaginal secretion is scanty, white in colour, and cheesy in consistence, containing epithelial cells and leucocytes; it is intensely acid in reaction and is characterized by the presence of long anærobic bacilli. These organisms appear to produce lactic acid and to exert a bactericidal influence on pyogenic bacteria introduced from without. In the other type considered by Döderlein to be pathological, the secretion is profuse, yellowish-white in colour, containing many leucocytes and epithelial débris; it is only slightly acid in reaction and contains a large number of micro-organisms of various kinds, including streptococci, which were present in 10 per cent. of the cases observed by him. Further observations have shown that whilst the acid vaginal secretion is unfavourable to the growth of organisms the bacillus of Döderlein itself only plays a subordinate part, and that although the two forms of secretion undoubtedly exist, it is of little practical value to distinguish between them.

The researches of Stroganoff, Dubendorfer, Bergholm, Burghardt, Vahle, Stolz, and others have in the main confirmed these conclusions. All these observers have found streptococci to be present in the vaginal secretion in a proportion varying from 10 to 15 per cent. of cases. Bumm and Sigwart, in 1904, reported that they were able to cultivate streptococci in 30 to 50 per cent. of women examined

during pregnancy, the secretion being obtained by the use of a speculum.

On the other hand, Krönig, in a series of 167 cases, was unable to demonstrate the presence of streptococci, and concluded that the vaginal secretion should be regarded as free from pyogenic organisms, with the exception of the gonococcus which was occasionally present. He was able to cultivate, however, a large number of anærobic organisms including an anærobic streptococcus; none of these organisms, possessed any pathogenic power. Whitridge Williams and Bergland have also published a series of observations which tend to show that if sufficient precautions are taken to avoid vulvar contamination no pyogenic organisms will be found in the vagina during pregnancy.

It seems probable that these widely different results are attributable partly to the absence of any uniform method of removing the secretion and partly also to the different culture media which have been adopted. Thus those observers who have used alkaline agar only, have rarely discovered streptococci; if, however, the agar is combined with a reducing substance, such as grape sugar, streptococci are found in a considerable proportion of cases, the secretion being obtained without any probability of vulval contamination (Bergholm, Bohne, Stähler, Winkler).

Walthard gives the following list of organisms which have been found to exist in the vagina of pregnant women, and which are indistinguishable from those present in puerperal infection.

(1) Facultative anærobic streptococci of the type of streptococcus pyogenes puerperalis—(Döderlein, Bohne, Stahler, Winkler, Bumm.)

(2) Facultative anærobic diplo-streptococci. (Natvig.)

(3) Anærobic streptococci. (Krönig and Menge.)

(4) Staphylococci of the type of staphylococcus albus.

(5) Bacteria of the coli group. (Bensis, Kottmann, Walthard.)

The following organisms are also found in rare instances and usually associated with offensive secretion.

(6) Bacillus funduliformis.

(7) Pseudo-tetanus bacilli.

(8) Bacillus ærogenes capsulatus.

We must therefore conclude that organisms indistinguishable from pyogenic streptococci, together with diplococci and the bacterium coli, are not unfrequently present in healthy women during pregnancy, especially in the lower part of the vagina.

The Cervix. The cervical canal during pregnancy is occupied by a plug of firm, clear mucus which effectually closes the uterine cavity. The secretion of the cervical glands appears to be an unsuitable culture medium for bacterial growth and, moreover, frequently contains phagocytes which exert a definite bactericidal

Gyn. Staff Room University Hospital.

influence. The vaginal portion of the cervix and even the lower part of the cervical canal contain many organisms, and these are much increased in numbers if erosions or lacerations are present.

Varaldo has recently investigated the cervical secretion in 32 pregnant women in whom these conditions existed, and was able to detect streptococci, gonococci and bacteria of the coli group in a considerable proportion of cases. Foulerton and Bonney also, in examining the cervical secretion of 30 non-pregnant women, found staphylococci, diphtheroid bacilli, and various forms of diplococci. None of these organisms, however, appear to be able to penetrate the protective zone of the cervical secretion during pregnancy, but it is not improbable that after delivery they ascend into the uterus and may become a source of infection.

All observers agree that the cavity of the uterus is free from organisms during normal pregnancy.

Bacteriology of the Generative Tract during the Normal Puerperium.

The Vulva. After delivery the vulval orifice is bathed in lochial discharge and a large number of organisms are almost constantly present. Investigations on the vestibular secretion by Natvig, Pilz and others, have demonstrated the presence of streptococci, staphylococci, and the bacterium coli in a large proportion of cases. These organisms usually appear to possess little virulence, but it is quite possible that if they are conveyed into the vagina they may develop some degree of infective power.

The Vagina. The vaginal discharge during the first 24 hours after delivery contains relatively few organisms. This is apparently the result of the cleansing process which occurs during labour as a result of the passage of the child's head with the placenta and membranes; it is possible also that the bactericidal power of the fresh blood may exert some influence. After the second day, however, a large number of organisms may be cultivated from the vaginal lochia. The bacillus of Döderlein, if present, disappears, and the organisms existing in the vagina before delivery multiply rapidly in the alkaline secretion. According to the observations of Krönig and Natvig organisms from the vulva frequently ascend into the vagina during the early days after delivery.

The Uterus after Delivery. The bacteria present in the uterine lochia have been investigated by numerous observers with widely different results. The early observations of Döderlein, Winternitz, von Ott and Czerinewski appeared to show that the lochial discharge was sterile in 70 to 80 per cent. of cases. Streptococci and pyogenic organisms were found in 7 per cent., and in the remainder anærobic saprophytic bacteria were present. Franz, however, in 1898, was

able to detect pyogenic organisms in every case in the later days of the puerperium. Subsequent observers, such as Burghardt, Wormser, Stähler, Vogel, and others have been able to cultivate organisms in from 20 to 50 per cent. of cases after the third or fourth day. Krönig, in a series of afebrile women found that streptococci and staphylococci were not infrequently present in the uterine cavity by the end of the third day, usually disappearing after the seventh day when the lochia became sterile. Organisms undoubtedly ascend from the vulva and vagina, even in women who have never been examined, and it has been demonstrated by Hellendahl that this takes place along the blood coagula which are usually present in the upper portion of the vagina and in the cervical canal.

Special significance must be attached to the existence of streptococci in the normal lochial discharge. These organisms appear to be present in 10 to 20 per cent. of all cases in the vaginal secretion and often in the uterine cavity.

Bumm and Sigwart, in a careful series of observations, discovered streptococci, in the lochial discharge, in 50 to 75 per cent. of cases examined within a few days of delivery.

Leo examined the lochia of 38 afebrile puerperal women and found streptococci in the vaginal secretion in 50 per cent. of cases, and in 17·6 per cent. these organisms were also present in the uterine lochia. Schenk and Scheib have also found these organisms in the uterine secretion after the seventh day in at least one-third of their cases.

Stolz investigated the contents of the uterus in a series of normal cases on the fourth day after delivery, and found that organisms were present in no less than 80 per cent. Even in women who had never been examined streptococci were found in the uterine secretion after the fourth day of the puerperium in 36·9 per cent. of cases. In some of these cases febrile symptoms developed which he believes may be attributed to slight traumatism inflicted in the removal of the secretion. He observed that the number of organisms in the uterine cavity diminishes during the later days of the puerperium, a feature which points to the uterus possessing the faculty of "self cleansing."

Mansfeld has recently examined the intra-uterine secretion of 40 afebrile puerperal women on the fourth and fifth days after delivery. He was able to detect organisms in 60 per cent. of cases, streptococci being present in 22·5 per cent.

In all these observations the secretion was obtained by the introduction of a glass tube into the uterine cavity, and it is impossible in this way to avoid contact with the secretion of the lower part of the cervical canal, and it is therefore probable that the cavity of the uterus itself is sterile in a greater proportion of cases than would appear from these figures.

Many attempts have been made to investigate the secretion in

the upper portion of the uterus without contamination by the cervical discharge, and the results show a much greater relative proportion of sterile lochia. Thus Little found that the cavity of the uterus immediately after labour was sterile in 92 per cent. of cases, and on the third day in 62 per cent. of afebrile cases. In only one instance was he able to detect the presence of the streptococcus pyogenes.

Nicholson and Evans believe that the positive results obtained by a large number of observers are due to faulty technique, and that the secretion in the uterus is sterile in normal cases throughout the puerperium. Their observations were made by the introduction of a speculum along the cervical canal, through which a tube was passed into the uterine cavity. In a few cases streptococci were observed, always, however, associated with symptoms of infection.

From this brief review of our knowledge, and in spite of much difference of opinion it must be concluded that organisms closely resembling those present in puerperal infection often exist in the upper part of the vagina, and in the cervical secretion shortly after delivery, and that this is frequently followed by invasion of the uterine cavity as a result of the spontaneous ascent of organisms. Our observations were made in the early days of the puerperium after disinfection of the vaginal portion of the cervix. In a large proportion of cases a positive result was obtained, but we think it is probable that in many instances the organisms were only present in the cervical canal and lower portion of the uterus.

It is important to know how far examinations and manipulations promote the entrance of organisms into the uterine cavity during the puerperium. Stolz made a series of investigations on the 4th and 9th days after delivery, and found that repeated examinations made with the sterile hand, and manipulations such as the application of forceps, or version, had little influence on the organisms present in the uterine cavity. The influence of the third stage of labour was, however, very definite. He found that if this was under one hour's duration the proportion of cases in which bacteria was present increased by 10 per cent. This is probably due to the fact that if the third stage is unduly hastened the liability to hæmorrhage and retention of portions of placenta or membranes is much increased. These results were also confirmed by Little, who found that lacerations of the perineum, vaginal examinations and operative delivery, provided that complete asepsis was maintained, exerted little influence on the "germ content" of the uterus during the puerperium.

Hæmolysis of Streptococci. The early observations of Bordet (1897) and Marmorek (1902) showed that many streptococci possess a hæmolytic power. Schlesinger, in 1903, conducted a series of experiments with the object of determining the significance of hæmolysis, but his results were not conclusive. Schottmüller was

the first who claimed that it was possible to determine the virulence of an organism by its power of hæmolysing human blood. For this purpose he made use of blood-agar as a culture medium and recognized three varieties of streptococci:—

(1) *The streptococcus pyogenes.* This is the organism found in puerperal infection. Within a few hours of inoculation it forms on the plates definite white areas indicating destruction of the red-blood corpuscles by hæmolysis.

(2) *Streptococcus mitior or gracilis.* These organisms produce areas of brown discolouration around the point of inoculation due to the formation of methæmoglobin but without obvious destruction of the corpuscles. This organism is often found as a saprophyte in the buccal and nasal cavities, and has only slight pathogenic power. It is also the organism frequently present in the vulvar and vaginal secretion.

(3) *Streptococcus mucosus.* This organism develops slowly in small colonies, but shows no hæmolysis. This type of streptococcus is observed rarely and does not appear to possess any pathogenic power.

Schottmüller, who has for several years made a large number of observations, claims that the hæmolytic power is proportionate to the virulence of the organism, and he regards the presence of a hæmolytic streptococcus as clearly indicating a pathogenic variety of the organism. His investigations have been largely confined to the organisms found in the blood in cases of septicæmia which always appear to possess a high degree of hæmolysis.

These conclusions have not been altogether confirmed by recent work, since many observers have shown that hæmolysis may be produced by organisms of little virulence.

Natvig made a large number of experiments on the hæmolysis of streptococci, and found that this is largely dependent on the mode of culture, and that many organisms possessed of little virulence showed very decided hæmolytic power, and that, in general, variations in hæmolysis do not run parallel to the virulence of the organism. It has not been found possible by cultural methods to convert a non-hæmolytic streptococcus into a hæmolytic organism. If, however, streptococci are inoculated into animals, such as mice, their virulence becomes intensified and this is often associated with the development of hæmolytic power.

The question as to the significance of the presence of hæmolytic streptococci in the lochial discharge or in the blood, however, can only be decided by systematic clinical observations, and considerable evidence exists that the organisms present in severe puerperal infection always show a marked capacity for hæmolysis.

Fromme has published the results of his observations on the presence of hæmolytic streptococci in puerperal women.

In a series of 100 normal pregnant women streptococci were found in the vaginal secretion in no less than 27. None of these were obviously hæmolytic, though in 3 cases a slight discolouration of the blood was observed around the colonies.

In 36 observations made on the lochial discharge of afebrile women after delivery he discovered streptococci in 19; none of these, however, were hæmolytic, and according to his observations the streptococci found in the lochia of afebrile puerperal women possess no hæmolytic power. They produce an area of brown discolouration on agar plates but no destruction of hæmoglobin, thus belonging to the group of streptococcus mitior.

In 14 women who presented signs of severe infection, hæmolytic streptococci were found in the lochia and, in 10 cases of general infection, he was able to obtain from the blood hæmolytic streptococci in each instance.

Gonnet, of Lyons, has also published figures which appear to confirm the conclusions of Fromme. In the vaginal secretion of 100 pregnant women he found streptococci in 16 per cent., but in no case did they possess any hæmolytic power and the puerperium was afebrile in each case. He also examined the lochial secretion of 100 women after delivery from the 5th to the 7th day. In 90 per cent. of these no streptococci were present. In 6 cases a streptococcus was found. This showed no hæmolytic power, and in these cases also the puerperium was afebrile. In four instances a typical hæmolytic streptococcus was detected and each patient developed acute infection. Gonnet also relates six cases of general septicæmia in which hæmolytic streptococci were cultivated from the blood in large numbers. All of these patients died.

The results of these observers appear to show that hæmolytic streptococci are never found in the vaginal secretion during normal pregnancy, or after delivery, and that if hæmolytic organisms are present puerperal infection has occurred.

Veit goes so far as to state that the presence of hæmolytic streptococci in the lochial discharge is to be regarded as a sign of the presence of grave infection, and that in these cases no local therapeutic measures should be undertaken on account of the danger of generalisation

Freymuth, who has recently made a contribution to this subject, entirely disputes the conclusions arrived at by Fromme. He isolated streptococci from the vaginal secretion of 20 pregnant women and compared these with a strain of streptococci derived from a fatal case of puerperal infection. He found no constant relation in the hæmolytic power, and regards hæmolysis as of no value in distinguishing pathogenic from saprophytic varieties of streptococci.

Heynemann has recently published some observations on the results of the examination of the lochial discharge in 125 afebrile puerperal women following in detail the technique of Schottmüller.

In only 22 of these cases was he able to detect hæmolytic streptococci. In 4 of these the organisms were also present in large numbers in the blood, and each case terminated fatally. In the remaining 18 the patients suffered from symptoms of severe local infection of the uterus, but the blood remained sterile throughout. All of these cases made good recoveries with simple treatment. He regards the presence of hæmolytic streptococci in the lochial secretion as of great practical value as in a doubtful case it may serve to complete the diagnosis. He further believes that it is not necessary to introduce a tube into the uterus, but that if these organisms are found in the secretion of the upper portion of the vagina a clinical diagnosis of the existence of infection may be made.

From these observations it is clear that in the great majority of cases of severe infection, the streptococci present possess well-marked hæmolytic power. The question, however, as to whether we really possess in this hæmolysis an absolute means of differentiating between saprophytic and pathogenic organisms is not yet settled.

Personal Observations.

Method of investigation. We have examined the lochial discharge from the cavity of the uterus in a series of 58 cases between the second and ninth days after delivery. The technique adopted in the removal of the secretion is important, as it is essential that it should be obtained without contamination by the vaginal discharge. The patient is placed in the lithotomy position and the vulva thoroughly cleansed. The labia are now held widely apart and a Sims speculum is introduced along the posterior vaginal wall. The cervix is thus readily exposed and the anterior lip is seized by a fine volsella. The vaginal portion is now thoroughly cleansed by sterilized absorbent wool. A curved glass tube (after the pattern introduced by Döderlein) is passed into the uterus, up to the fundus. Suction is made by means of a syringe and as much lochial discharge as possible obtained from the uterine cavity.

Preparation of the plates. The blood was obtained from the median basilic vein of a healthy individual. This can be very simply carried out and causes a very small amount of discomfort. The arm is tightly bandaged below the shoulder and the skin around the elbow disinfected; a small incision is now made over the distended vein in order to avoid any possibility of contamination from the skin. For the removal of the blood a glass syringe after the pattern of Luer was used. It is essential that this should be previously washed out with a sterile solution of citrate of potash in order to prevent premature coagulation of the blood. The needle is

Hæmolysis produced by streptococci on blood agar plates.

introduced into the vein in a direction opposite to the blood flow. The syringe rapidly fills, 10 cc. of blood being usually removed. This is now immediately added to a solution of agar in a test tube in the proportion of 2 cc. of blood to 5 cc. of agar; after thoroughly mixing the solution is poured on to the Pétri plates.

Mode of culture. The contents of the uterine tube were immediately smeared on to the surface of freshly prepared blood agar by means of a spatula made of platinum foil. The plates were incubated at a temperature of 37°C. in an inverted position, in order to prevent condensation of water on the surface of the agar. The plates were examined at the end of 24 and 48 hours and coverglass preparations made for each variety of colony present on the plate. In many instances sub-cultures were also made in order to identify the type of organism. Hæmolysis was usually observed at the end of 24 hours, but in some cases it was necessary to wait until the end of the second day. The appearances were quite characteristic, each hæmolytic colony being surrounded by a characteristic white zone of absorption. Microscopic examination of the hæmolytic area showed complete disappearance of the hæmoglobin. The anaerobic cultures were made by mixing the blood with recently boiled glucose agar. The plates were then placed in a glass vessel from which all the air was exhausted by means of a water pump.

Results. The day after delivery on which the secretion was removed was as follows:—

2nd	day	15	cases	sterile	2	organisms	found in	13
3rd	,,	20	,,	,,	5	,,	,,	15
4th	,,	6	,,	,,	1	,,	,,	5
5th	,,	6	,,	,,	0	,,	,,	6
6th	,,	4	,,	,,	2	,,	,,	2
7th	,,	2	,,	,,	0	,,	,,	2
8th	,,	3	,,	,,	2	,,	,,	1
9th	,,	2	,,	,,	0	,,	,,	2
Total		58			12			46

The contents of the uterus were sterile in 12 cases only, *i.e.*, a proportion of 20 per cent., and it is noteworthy that in 5 of these cases no vaginal examination had been made throughout. In 80 per cent. of cases bacterial growth appeared on the blood agar plates, usually within 24 hours of inoculation. The organisms found were as follows:—

Streptococcus pyogenes: Hæmolytic, 5 cases; Non-hæmolytic, 7 cases.

Staphylococcus pyogenes: Hæmolytic, 26 cases; Non-hæmolytic, 27 cases.

Diplo-streptococcus: This appears to be the organism described by Natvig as the "para-pneumococcus," 14 cases.
Bacilli of the Coli Group: 10 cases.
Pseudo-diphtheritic bacilli: 18 cases.
Proteus bacilli, 3 cases.

The anærobic bacteria present in the secretion were cultivated in 10 cases. In 2 the plates remained sterile. The organisms present in the other cases were anærobic staphylococci and lanceolate diplococci, which frequently showed some power of hæmolysis.

The staphylococci. The staphylococcus albus was the organism usually present, but in a few instances colonies of the staphylococcus aureus were observed. Hæmolytic and non-hæmolytic colonies frequently occurred together, but the hæmolysis was often not visible until the end of 48 hours. It was noticed in making sub-cultures that the non-hæmolytic variety of staphylococcus liquified gelatine much more rapidly than the hæmolytic form.

Streptococci. The hæmolytic streptococci formed long chains and grew abundantly in peptonised broth producing a thick flocculent deposit. The pathogenic power of two strains of hæmolytic streptococcus was tested by inoculation into rabbits. One of them, derived from a case which manifested signs of infection produced no lesions; the inoculation was not, however, made until the streptococcus had been cultivated for three weeks. In another case the hæmolytic streptococcus from a normal puerperium was inoculated into the hind leg of a rabbit; this was followed by the formation of a large abscess with local lymphatic infection. No organisms, however, were found in the pus and no growth was obtained on culture, thus showing that the organism was possessed of very slight pathogenic power.

Pseudo-diphtheria bacilli. In some cases these bacilli were very short and resembled the Hofmann bacillus, but usually the organisms were microscopically indistinguishable from the Klebs-Loeffler bacillus and showed granules which stained by Neisser's method.

Diplococci. These organisms were present in 20 per cent. of cases and were of two distinct types. Both forms were facultative anærobes growing equally well, ærobically and anærobically. Many of the colonies showed well marked hæmolysis.

One of the organisms presented all the features of the para-pneumococcus described by Natvig. A similar organism has also been found in the urethral secretion of healthy men by Pfeiffer.

The other type of organism met with was a lanceolate diplococcus. This appears to be the organism described as occurring in puerperal infection by Foulerton and Bonney, and is indistinguishable from the pneumococcus.

These organisms are, according to the observations of Natvig, in their cultural and biological features, closely allied to the streptococcus pyogenes.

Bacillus coli. Organisms of this type were present in 10 cases, always associated with other organisms, especially, staphylococci and diplococci.

Proteus bacilli. These organisms were present in three cases. They have been frequently found in the lochial secretion, and do not appear to be of much importance.

CHARACTER OF THE PUERPERIUM. In 53 patients the course of the puerperium was afebrile throughout. In 5 instances a rise of temperature was observed. The notes of these are briefly as follows:—

In two cases (Nos. 27 and 52) the temperature rose to 101·4 and 101·6 respectively on the evening of the day on which the culture was taken. This was the only rise of temperature during the puerperium. In both cases hæmolytic staphylococci, and in one instance a non-hæmolytic streptococcus were cultivated from the lochial secretion. The temperature in each case fell to normal within 24 hours, and it is probable that the slight fever was the result of traumatism produced by the introduction of the uterine tube.

In one instance (No. 48), a multipara, labour was natural, but the temperature rose to 103.8° 48 hours after delivery. The uterine cavity was immediately explored and douched, clots being removed; this was followed by a gradual fall of temperature which became normal on the 7th day. Cultures taken on the 6th day showed the presence of diplococci and the bacterium coli.

In the fourth case of pyrexia the patient (No. 4), a multipara, was admitted during labour on account of severe accidental hæmorrhage. The membranes were artificially ruptured and delivery ensued without further bleeding. The temperature reached 100° on the second day, and a culture of the uterine contents showed the presence of hæmolytic staphylococci. On the third day the temperature rose to 103°. The uterus was now thoroughly disinfected and this was followed by marked improvement, the temperature becoming normal on the seventh day. This appears to have been an example of staphylococcic endometritis of a relatively mild type.

The last case is of considerable interest, as it is the only instance of infection associated with the presence of hæmolytic streptococci in the uterine cavity.

The patient (No. 50), a secundipara, was admitted to hospital during labour. Delivery was effected by forceps, and this resulted in some degree of laceration of the perineum.

The temperature rose to 103° on the third day. Cultures taken from the uterus showed the presence of streptococci possessing very marked hæmolytic power. On the fourth day the uterine cavity was explored and douched. The temperature fell the same evening to

101°, and became normal in 3 days. The lochial discharge continued to be profuse and purulent for seven days.

This case must be regarded as one of localised streptococcic infection of the endometrium.

These results show that organisms are frequently found in the uterine cavity as early as the second or third day after delivery.

It is, however, impossible by the ordinary methods of obtaining lochial secretion to avoid contact with the cervical canal, and it seems probable that in many of these cases the organisms had not reached the upper portion of the uterine cavity. Our figures show a much higher percentage of cases of bacterial invasion in the early days of the puerperium than those of many other observers; this is perhaps attributable to the facts that we have used for cultures agar mixed with human blood, which is an extremely favourable medium for all forms of bacterial growth, and that the plates were placed in the incubator within a very short time after inoculation. The organisms present are precisely those which have been frequently found in the vaginal secretion during pregnancy. It is however probable that these are reinforced by bacteria from the vulva ascending into the vagina either spontaneously or as the result of manipulations during delivery. In a considerable number of cases some operative interference was required, and this probably exerts some influence in facilitating the early invasion of the uterine cavity. On the other hand, organisms were found with almost equal frequency after normal labour, and even in cases in which no vaginal examination had been carried out.

The course of the puerperium was in the great majority of cases entirely uninfluenced by the presence of the organisms. It is probable that in many instances they only exist in small numbers and possess little, if any, pathogenic power; moreover, the uterine cavity speedily becomes protected by an epithelial cellular layer which, according to the observations of Krönig, is often fully developed by the end of the 5th day.

The primary object of this investigation was to test the conclusions of those observers who maintain that the presence of hæmolytic streptococci in the vaginal or uterine secretion after delivery must be regarded as pathogonomic of the existence of infection. There can be no doubt from the clinical observations of Schottmüller, Gonnet, Fabre, Fromme and others, that the streptococci present in cases of severe infection are characterized by great hæmolytic activity. This is not only observed in the organisms obtained from the uterine cavity, but is a characteristic feature of the streptococci which may be cultivated from the blood. It has also been observed that the streptococci present in the peritoneal fluid in

cases of infection are always hæmolytic. Our results show that hæmolytic streptococci may exist in the lochial secretion without any evidence of infection. Streptococci were present in 12 cases in all, *i.e.*, in 20 per cent. of the total number. In 7 instances the organisms showed no hæmolytic power and correspond to the type of streptococcus mitior of Schottmüller or the streptococcus gracilis of other observers. In all of these cases the puerperium was normal except that in one instance the temperature rose to 101·6 a few hours after the intra-uterine culture was obtained, and this is probably to be regarded as directly due to the introduction of the tube. In 5 cases hæmolytic streptococci were cultivated. In 4 of these the puerperium was afebrile throughout, but in one case (No. 43) febrile symptoms developed; these, however, remained limited to a superficial infection of the endometrium. It must therefore be acknowledged that streptococci, indistinguishable from those found in severe forms of infection, may exist in the lochial discharge of puerperal women even in the early days of the puerperium without causing any rise of temperature. This may be explained either by the fact that hæmolysis is often produced by organisms possessing a very slight degree of virulence, or we must assume that these patients possess considerable resisting power to infection. It is, therefore, not possible to claim that the hæmolysis forms an absolute distinction between the saprophytic and slightly virulent organisms and those which are pathogenic. If, however, hæmolytic streptococci are discovered in a case of fever after delivery it is probable that they are the causal agents of the infection.

The question as to whether the saprophytic streptococci existing in the vagina before delivery are capable of developing infective power is of great importance and cannot be regarded as absolutely decided. It is possible that under favourable conditions they may alter in type, but there can be no doubt that in almost every instance the highly virulent hæmolytic streptococci are introduced from without.

Since these observations were completed it is interesting to note that Fromme has made a communication on this subject in which he states, that as a result of further investigations, he has repeatedly found hæmolytic streptococci in the lochial discharge of afebrile puerperal women and also in many cases of mild infection. He has therefore proposed a method of distinguishing between the highly virulent hæmolytic streptococci and those possessing little or no infective power, which essentially depends on the variability of their rate of growth in a solution of defibrinated blood. This method, however, is very complicated and cannot be generally adopted.

We must therefore conclude that we do not possess in the hæmolysis of streptococci any absolute indication as to the virulence of the organism.

It is remarkable that in the literature of the subject we have not found any reference to the occurrence of hæmolytic staphylococci in the uterine lochia. These organisms were present in almost half of the total number of cases, but in only one instance was any sign of infection observed. This occurred in the form of a superficial endometritis from which recovery speedily ensued.

We desire to state that the bacteriological observations have been carried out in the Public Health Laboratory of the University, through the courtesy of Professor Sheridan Delépine, to whom we express our thanks.

Conclusions.

(1) In a series of 58 cases in which the lochial secretion was examined between the second and ninth day after delivery, organisms were found to exist in the cervical canal and cavity of the uterus in 80 per cent. of observations.

(2) The organisms were mainly those which have been shown to be present in the vaginal secretion during pregnancy. There is, however, considerable evidence to show that organisms also ascend from without during the early days of the puerperium.

(3) The course of the puerperium was, in the great majority of cases, entirely uninfluenced by the presence of organisms.

(4) Streptococci were cultivated in 20 per cent. of cases, and frequently showed marked power of hæmolysis.

(5) The presence of hæmolytic streptococci in the vaginal or uterine secretion cannot, in itself, be regarded as an indication of the existence of infection.

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ANALYSIS OF CASES SHOWING ORGANISMS PRESENT IN THE UTERINE SECRETION DURING THE PUERPERIUM.

No. of Case.	No. of Children.	Day after delivery on which bacteriological examination was made.	Note as to Vaginal Exam.	Staphylococci. Non-Hæmolytic.	Staphylococci. Hæmolytic.	Streptococci. Non-Hæmolytic.	Streptococci. Hæmolytic.	Diplococcus.	Bacillus Coli Type.	Pseudo diphtheritic bacillus.	Other organisms.	Remarks.
1	7	2nd day	Yes	—	—	—	—	x	x	x	—	Normal
2	1	2nd day	No	→	—	—	x	x	x	—	—	Normal
3	2	2nd day	Yes	x	—	—	—	—	—	—	—	Normal
4	6	2nd day	Yes	x	x	—	—	—	—	—	—	Accid. Hæmorrhage Temp. 102°·6 2nd day
5	2	2nd day	Yes	—	x	x	—	—	—	x	—	Normal
6	1	2nd day	Yes	x	—	—	—	x	—	x	—	Normal
7	9	2nd day	No	x	x	—	—	—	—	x	Proteus Bacilli	Normal
8	1	2nd day	No	x	—	—	—	—	x	—	—	Normal
9	1	2nd day	Yes	x	x	x	—	—	—	—	—	Placenta prævia. Version
10	5	2nd day	Yes	x	x	—	—	—	—	—	Anærobic Staphylococci and Diplococci	Normal
11	7	2nd day	Yes	x	x	—	—	x	—	—	—	High Forceps
12	7	2nd day	No	—	—	Sterile		—	—	—	—	Normal
13	1	2nd day	Yes	—	x	—	—	—	—	—	Anærobic Staphylococci and Diplococci	Breech presentation. Forceps to head
14	1	2nd day	Yes	—	—	Sterile		—	—	—	—	Normal
15	1	2nd day	Yes	x	x	—	—	—	—	—	—	Normal
16	2	3rd day	Yes	x	—	—	—	x	x	—	—	Breech presentation. Normal delivery
17	1	3rd day	No	x	—	—	—	—	—	x	Proteus Bacilli	Normal
18	17	3rd day	Yes	—	—	—	x	x	—	—	—	Normal
19	1	3rd day	Yes	—	x	x	—	—	—	—	—	Forceps
20	2	3rd day	No	—	—	Sterile		—	—	—	—	Normal
21	3	3rd day	Yes	—	x	—	—	x	—	x	—	Normal
22	3	3rd day	No	—	x	x	—	—	—	x	—	Normal
23	3	3rd day	Yes	—	—	—	—	—	x	—	—	Normal
24	1	3rd day	Yes	—	—	Sterile		—	—	—	—	Normal
25	1	3rd day	Yes	—	x	—	x	x	—	x	—	Rupture of Perineum.
26	3	3rd day	No	—	—	Sterile		—	—	—	—	Normal
27	7	3rd day	No	x	x	—	—	—	—	—	—	Temp. 101°·4 3rd day

25	...	1	...	3rd day	...	Yes	...	—	...	x	—	...	x	...	x	...	—	...	x	...	—	Rupture of Perineum.
26	...	3	...	3rd day	...	No	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	Normal
27	...	7	...	3rd day	...	No	...	x	...	x	—	...	—	...	—	...	—	...	—	...	—	Temp. 101°·4 3rd day
28	...	3	...	3rd day	...	Yes	...	x	...	x	—	...	—	...	—	...	—	...	x	...	—	Induction of Labour
29	...	10	...	3rd day	...	Yes	...	—	...	x	—	...	—	...	x	...	—	...	x	...	—	High Forceps
30	...	5	...	3rd day	...	Yes	...	—	...	—	—	...	—	...	—	...	—	...	x	...	—	Normal
31	...	6	...	3rd day	...	Yes	...	x	...	—	—	...	x	...	—	...	—	..	x	...	—	Breech presentation
32	...	10	...	3rd day	...	Yes	...	—	...	—	—	...	—	...	—	...	x	...	—	...	Proteus Bacilli	Placenta prævia. Version
33	...	2	...	3rd day	...	Yes	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	Normal
34	...	2	...	3rd day	...	Yes	...	x	...	—	—	...	—	...	—	...	—	...	—	...	Anærobic Staphylococci	Normal
35	...	5	...	3rd day	...	No	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	Normal
36	...	2	...	4th day	...	Yes	...	x	...	—	—	...	—	...	x	...	—	...	x	...	—	Normal
37	...	3	...	4th day	...	No	...	x	...	x	—	...	—	...	—	...	x	...	—	...	—	Normal
38	...	3	...	4th day	...	Yes	...	x	...	x	—	...	—	...	—	...	—	...	—	...	—	Breech presentation
39	...	2	...	4th day	...	Yes	...	—	...	x	—	...	—	...	—	...	—	...	—	...	—	Normal
40	...	1	...	4th day	...	Yes	...	x	...	x	—	...	—	...	—	...	—	...	—	...	—	Normal
41	...	1	...	4th day	...	No	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	Normal
42	...	1	...	5th day	...	Yes	...	—	...	x	x	...	—	...	x	...	—	...	x	...	—	Normal
43	...	10	...	5th day	...	Yes	...	x	...	—	—	...	—	...	—	...	—	...	x	...	—	5 months pregnancy
44	...	2	...	5th day	...	Yes	...	x	...	—	—	...	—	...	—	...	—	...	x	...	—	Normal
45	...	4	...	5th day	...	Yes	...	x	...	—	—	...	—	...	x	...	—	...	—	...	—	Transverse presentation. Int. version. Intra-uterine Douche given after delivery
46	...	1	...	5th day	...	Yes	...	x	...	x	—	...	—	...	—	...	—	...	x	...	—	Normal.
47	...	2	...	5th day	...	Yes	...	—	...	—	—	...	—	...	x	...	—	...	—	...	—	
48	...	7	...	6th day	...	Yes	...	—	...	—	—	...	—	...	x	...	x	...	—	...	—	Temp. 2nd day 103°. Curettage. Gradual fall to Normal 7th day
49	...	1	...	6th day	...	Yes	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	Normal
50	...	1	...	6th day	...	Yes	...	—	...	—	—	...	x	...	—	...	—	...	x	...	—	Forceps. Lac. of Perineum. Temp. for 5 days max. 102° 3rd day
51	...	1	...	6th day	...	Yes	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	Normal
52	...	4	...	7th day	...	Yes	...	x	...	x	x	...	—	...	—	...	—	...	—	...	—	Temp. rose to 101°·8 7th day
53	...	1	...	7th day	...	Yes	...	—	...	—	—	...	—	...	—	...	x	...	—	...	—	Normal
54	...	2	...	8th day	...	Yes	...	x	...	x	Sterile	...	—	...	—	...	—	...	—	...	—	Normal
55	...	5	...	8th day	...	Yes	...	x	...	—	—	...	—	...	—	...	x	...	—	...	—	Cæsarean Section
56	...	8	...	8th day	...	Yes	...	—	...	—	Sterile	...	—	...	—	...	—	...	—	...	—	Normal
57	...	1	...	9th day	...	No	...	—	...	x	x	...	—	...	—	...	—	...	—	...	—	Normal
58	...	10	...	9th day	...	No	...	—	...	x	—	...	—	...	—	...	—	...	x	...	—	Normal

REPORTS OF LYING-IN HOSPITALS.

During recent years the annual publication of a clinical report has become one of the features of the various lying-in hospitals, and below we review the reports of the Rotunda Hospital and of the Maternity department of St. Mary's Hospital, Manchester. These reports, especially when in such completeness of detail as these two, form a valuable contribution to obstetrical literature. The description and tabulation of a large number of cases are not only of value from a statistical point of view, but form a medium for interchange of thought and comparison of methods of practice. From the successes of our colleagues we may learn to retain much that is good, and from their failures we may be taught to reject methods which have not proved of service in their hands.

Useful as these reports undoubtedly are, their usefulness could be much increased if they were drawn up, as far as possible, on a uniform plan as regards the tabulation of cases, and methods of treatment. In the estimation of morbidity, for example, three different standards are used—the British Medical Association, the Rotunda, and the Queen Charlotte's Hospital standards. (An admirable comparison of these standards is given by Dr. C. Nepean Longridge, in the Report of Queen Charlotte's Hospital for 1907.)

With a little give and take on all sides, the authorities of the various lying-in hospitals could well come to some agreement in this matter, and decide on a definite system for the drawing up of their future reports. They would then confer a real benefit on the science of obstetrics.

Report of the Rotunda Hospital.

The report is divided into three parts—Maternity, Gynæcological and Pathological.

The Maternity department now contains 85 beds and 64 cots for infants. These are ample for present requirements, but should occasion arise, we learn that the number of beds can be increased to well over 100. In the year under consideration, 1902 women were delivered in the hospital. The morbidity, estimated by the Rotunda method, shows a further gratifying decrease: it is 3·99 per cent., as compared with 4·3 per cent. in the previous year. Such a standard of excellence is deserving of the warmest congratulation. Only 14 cases of contracted pelvis are recorded. This low number might lead one to suppose that in Dublin, contracted pelvis is seldom met

with. But it is explained by the fact that no case is included with a conjugata vera of more than 9 cms. (3½ inches). Surely, by accepting this standard, many cases of minor contraction have escaped inclusion. Amongst the methods of treatment adopted—pubiotomy was performed 5 times, with success to the mother in all cases, and to the child in 4; Cæsarean section 3 times, with success to mother and child in all cases; induction of premature labour was resorted to on only two occasions.

Since pubiotomy is, in this country, at all events, a comparatively untried operation, it is interesting to quote in Dr. Hasting Tweedy's own words, the technique he employs:—

"I have made it a point to do all these operations in the labour ward with the patient placed on the ordinary couch, as I think by doing so I press home to the students the great educational fact that such an operation may be undertaken amidst the usual domestic surroundings.

"The pubes is shaved and the vagina thoroughly douched out as a preliminary to plugging with pledgets of moist cotton wool in the manner employed for accidental hæmorrhage. This plugging has the effect of stretching the vagina to its utmost, and tends to prevent subsequent laceration and to hasten delivery when once the bone has been severed.

"Preparations now go on briskly; these include boiling forceps, catheter, gloves, silk or silk worm, curved needles, scissors, knife, Gigli's saws and Döderlein's needle (the instrument I have always employed), and placing the patient in the cross-bed position, with legs held apart by an assistant sitting at either side.

"The plugs are now taken out, having remained in for probably half an hour or a little longer; again, the parts are disinfected, the bladder emptied, and a small vertical incision made over the pubes down to the bone, about three-quarters of an inch from the symphysis. The big needle held firmly in the right hand is pushed through from above downwards, hugging the bone in its descent, and is made to emerge on the outside of the labium majus, which is pulled inwards by an assistant. A stab through the skin makes the needle point emerge, and on it the wire-saw is attached, and pulled through from wound to wound, when the needle is withdrawn. It is sometimes hard to be perfectly sure when the moment of complete separation of the bone has arrived; this separation can be made instantly evident to an assistant, who places a finger on the skin in front of the advancing saw. After delivery the soft parts are brought together by a few sutures, and the pelvis is strapped up by placing round the hips a broad navvy's belt.

"No particular pains need be taken to keep the bones rigidly in apposition, nor need the patient be kept lying on her back for more

than a couple of days. The operation is undoubtedly a valuable one, and somewhat easier to perform than symphysiotomy; but in the light of our present knowledge I cannot but believe that convalescence in the latter could be made quite as short and uneventful."

There were 14 cases of antepartum hæmorrhage—6 accidental and 8 due to placenta prævia. The mother recovered in all. The former were all mild cases, and it was only once necessary to resort to the traditional Rotunda treatment of vaginal plugging. All the cases of placenta prævia were treated by version, and we notice that de Ribes' bag was never employed. Though the result to the mother was all that could be desired, the fœtal mortality was 75 per cent. Forceps was used for delivery in 3·8 per cent. of cases. This, compared to practice elsewhere, is a low forceps-rate. The indication in the vast majority of cases was "delay in the second stage, with danger to mother or child."

From this we conclude that no limit is placed on the duration of the second stage, so long as all is well, and that the forceps is only applied when there are definite indications of danger to mother or child. We are personally in favour of placing a limit of 2 or 3 hours on the duration of the second stage in all cases, and of delivering the patient if natural delivery is likely to be further delayed, so as to anticipate such dangers as exhaustion of the uterus and threatened asphyxia of the child. However, practice must be judged from results, and it is at once apparent, on looking through the tables given, that the results are good. The number of children born dead in forceps cases was 8 (including one macerated fœtus) or 10·8 per cent., and the total number of recently dead still-born children in all cases during the year was 49. There were only 25 cases of post-partum hæmorrhage, but we should like to be informed, in a future report, what amount of blood lost, is considered to be "post-partum hæmorrhage." Since no mention is made in the tables of this subject, beyond mention of the number of cases, it is to be concluded that none were severe.

There were 9 cases of eclampsia with 2 deaths. The cases were all treated on traditional lines, and the authorities of the Rotunda Hospital have not taken to the treatment by "rapid delivery"—so strenuously advocated by many continental authorities.

The maternal mortality is low, only ·37 per cent., in spite of the large number of severe cases treated during the year. This, in conjunction with the low morbidity-rate, is sufficient indication of the high standard of obstetrical practice which has been attained in the "premier lying-in hospital" of the United Kingdom.

The Gynæcological report extends over a period of 2 years. The total number of patients admitted was 981, and some of these were cases

in which no operative treatment was necessary, or in which operation was refused. The total number of operations performed comes to 1,153, of which 468 come under the heading of curettage. This excess of operations over cases is, of course, explained by the fact that in many cases several operations were necessarily performed at the same time. In vaginal fixation of the uterus, for example, anterior colporrhaphy, amputation of the cervix and colpo-perineorrhaphy were in nearly every case associated. Turning to the major operations, we are surprised to find that operative measures for the rectification of retro-deviated uteri were undertaken in no less than 94 cases—the method of Alexander-Adams being employed in 5 cases, vaginal fixation in 23, and ventral fixation in the remaining 66.

In our own opinion, operations for fixation of the uterus in a forward position are not usually indicated in such a large proportion of cases as this: but perhaps special circumstances prevailed. It cannot be denied that they expose the patients to certain risks in future pregnancies and labours. It is not quite clear what method was employed, for though the cases are placed under the heading of *ventro-fixation,* in the text we are told that the operation was one of abdominal *suspension*—two operations which are distinct and separate. Dr. Tweedy writes:—

"We consider the operation one of great value, not merely on account of the permanent relief it gives the patient from symptoms arising from the retroversion, but because it allows of a clear view of the tubes and ovaries and the general condition of the pelvis. Repeatedly, when we have opened the abdomen, the tubes were found to have their fimbriated extremities glued together and the lumen occluded or bound down with adhesions. The ovaries also may be diseased. These conditions being present it is very doubtful whether, in many instances, the mere relief of symptoms by curettage and the insertion of a pessary after replacement will overcome the existent sterility. Resection of the tubes and ovaries, or breaking down adhesions and probing the tubes, can be done through a very small incision, and, together with ventro-suspension, we believe, give the best hope of success. In one case, where operation for prolapse had failed, the uterus was sewn into the abdominal wall; climacteric past."

For cancer of the uterus, hysterectomy was performed in 20 cases. The abdominal route was chosen in all save 3 cases, "which presented difficulties in the form of fat abdominal walls and fixity of the uterus, the vaginal route being elected."

The mortality following abdominal extirpation of the uterus for cancer amounted to 35·3 per cent. This high mortality is explained

when we read that no case was considered inoperable that did not show marked disease of the bowel or bladder; that many of the cases were too advanced to admit of a typical Wertheim operation, the disease frequently involving not only the bladder, but also the parametrium beneath the ureters; that many of the women were in a condition that would have made even minor surgery dangerous; and, further, that in one case the disease was so widespread that it was impossible to do more than amputate the uterus. The only conclusion we can come to is that many cases were operated upon in whom the disease was far beyond the scope of operative treatment, and which would have been better left alone.

We are pleased to see that, wherever possible, conservative measures were used in the treatment of fibroids and tubal disease. Myomectomy was adopted when possible—in 5 cases the vaginal route was chosen and in 9 the abdominal. On two occasions when the latter route was chosen, the tumours were contained in the uterus, and the procedure followed was bisection of the uterus, removal of the growths, followed by curettage of the organ from its abdominal aspect, and then the two halves were brought together by sutures.

Plastic work on the tubes was always undertaken in these cases when the fimbriated extremities were adherent or when the tube itself was in part occluded, new ostia were made, probes passed along the tube into the uterus, or the diseased portion excised. This type of operation was often associated with resection of the ovaries when disease was present in a localised form.

It is interesting to notice that Pfannenstiel's incision was practised 27 times, with pleasing results. Two varieties were met with during the period covered by this report. One was a case of ovarian pregnancy; the other was a case of complete cartilaginous degeneration of the clitoris.

Pathological report. The Rotunda Hospital is to be congratulated upon the excellence of its Pathological department, which has dealt with a large amount of material. The work of the laboratory lies chiefly in the field of clinical pathology, as an aid to the working of the hospital, but it is pleasing to hear that an increasing number of students are taking advantage of the facilities afforded for pathological study and for investigating cases from the pathological side. The opportunities for research work in such a laboratory are great, and, in future reports, we look forward to seeing references to work published from the laboratory.

Curettings and other fragments were examined for purposes of diagnosis on 68 occasions. Reference is made to the long period for which the condition of post-abortive endometritis may exist: in the case of a woman who aborted in January and was curetted in May, the curettings still showed villi and decidual cells. We can sympathize with the difficulties found in devising a proper classifica-

tion of endometritis, but do not think the one adopted here is very excellent. Tumours and operative specimens were examined in 76 cases. Columnar carcinoma of the cervix was met with more frequently than epithelioma of the cervix in the proportion of 5 to 4. Seven of the 32 fibroids examined showed degenerative changes. Three cases of primary carcinoma of the ovary are recorded.

A very interesting condition was once met with—the condition of varicosity and thrombosis of the ovarian veins. Within a few weeks after delivery, an adherent placenta having been removed by the hand, a tumour was discovered in the right iliac fossa. It extended up in the lumbar region, reaching the kidney, and displacing the hepatic flexure of the colon. An operation was performed and the mass removed. It was found to consist of a dense plexus of large veins, bound together in strong, fibrous tissue. The veins were completely thrombosed. It would appear as if some accident of the puerperium had given rise to thrombosis in a pre-existing varicosity, thereby giving the appearance of a rapidly growing tumour.

Bacterioscopic examination of the uterine lochia was made in 17 morbid cases. In 9 cases the diplococcus aureus was met with: the diplococcus pneumoniæ in 7 and streptococci in 5.

In conclusion, we would like to congratulate heartily Dr. Tweedy and his assistants for presenting to the profession such a valuable contribution to obstetrical and gynæcological literature as the present Report of the Rotunda Hospital.

Report of the Maternity Department of St. Mary's Hospitals, Manchester.

The Report for the year 1907 has been drawn upon a more extended scale than in previous years, and contains a clinical record of real value.

The number of patients treated during the year was 3,765, of whom 468 were admitted to the wards and 2,897 attended at their own homes. It is sad to hear that there is a decrease of 1,049 from last year, due to lack of funds, which has had a two-fold effect—the reduction of the number of beds available for maternity patients from 40 to 20, and the restriction of the area attended by the hospital midwives; we sincerely hope that this state of affairs is only temporary.

A change for the better has been made in the training of midwives; formerly they spent the whole four months in the wards, now they spend 2 months in the wards and the remainder in attending patients at their own homes.

Though the number of cases treated in the hospital is small, yet the material is excellent, and one is immediately struck by the large number of abnormal cases treated during the year. Thus, out of the total number of 468 patients, there were 34 cases of placenta prævia, 18 cases of eclampsia, 14 cases of accidental hæmorrhage and 14

Cæsarean sections, to mention but a few examples. This is accounted for by the fact that the hospital is very largely used for the admission of abnormal cases met with in the large external maternity department. Many cases also are admitted as urgencies on the recommendation of a medical man, often after attempts at delivery have been made.

Both these causes have contributed to the high mortality rate. There were 16 deaths during the year, making 3·4 per cent.

Turning to the morbidity tables, we find the high rate of 14·2 per cent., attributable also, of course, to the same two factors and to the large number of operative and urgency cases.

Amongst the septic cases are included 7 cases of placenta prævia, in each of which repeated examinations had been made prior to admission. "The vagina was often packed with strips of unsterilized linen when the patient arrived at the hospital." Under such circumstances, indeed, the high morbidity-rate cannot be laid to the blame of defects in the routine work of the hospital!

The standard of morbidity adopted is that recommended by the British Medical Association. Sepsis of the genital tract is conveniently divided into "slight" and "severe" cases; but we think it is a pity that no attempt has been made to differentiate between sapræmic and septic infection. Many of the latter can be diagnosed by cultures taken from the blood, and valuable indications given for the more modern treatment by sera and vaccines.

We are in thorough agreement with the statement that "It is highly desirable in a teaching institution that opportunities should be afforded to the pupils and students for observation of some of the more importast complications of pregnancy." Table ii shows 15 cases of diseases of pregnancy, the patients being discharged undelivered; many more patients were, of course, admitted for diseases of the kind, but were delivered before being discharged.

Under placenta prævia we find that 34 cases were treated, with the low maternal mortality of 5·9 per cent., and with a fœtal mortality of 58·8 per cent. With such excellent results we naturally turn to the treatment adopted. In 9, labour terminated naturally, giving a fœtal mortality of 22·2 per cent. Good results were obtained in 7 cases by manual dilatation of the cervix and rapid delivery of the child, although the fœtal mortality amounted to 42·8 per cent. Treatment by podalic version was adopted in 12 cases, and was attended by the high fœtal death-rate of 91·6 per cent. Champetier de Ribes' bag was used on 3 occasions, with a fœtal mortality of 66·6 per cent. In the 2 fatal cases, neither of the patients died directly from the condition of placenta prævia; one, with albuminuria, died on the 5th day from suppression of urine, and the other, on the 4th day, from pneumonia.

Sixty-one cases of contracted pelvis were met with during the year. Each patient who applies to be attended during labour is seen

Gyn. Staff Room University Hospital.

by the resident surgical officer, who examines all primigravidæ, and multiparæ with histories of difficult labour. If contraction of the pelvis is discovered, the method of treatment is determined after consultation with a member of the Honorary Medical Staff. In 12 cases natural delivery occurred; 17 were delivered by forceps; Cæsarean section was performed in 14 cases, with one death. This was in the case of a patient who was admitted after repeated attempts at extraction had been made by forceps. Cæsarean section was preferred to craniotomy because the child was still alive; death occurred from sepsis on the 3rd day. Now, this is a type of case of common occurrence in hospital practice, and eminently suitable for pubosteotomy or symphysiotomy: it is a pity the patient was not delivered by one of these means.

Labour was induced by bougies on only 11 occasions, and the results to the children were anything but good, for only 7 children were born alive, and all labours were instrumental. It is a pity that the dates are not given more accurately: "8 months" conveys to us nothing; we are not told even if they are lunar or calendar months; where possible, dates should always be given in weeks. In spite of the bad results obtained here, we still think highly of this method for the treatment of minor grades of contracted pelvis. It is not the method itself, but the faulty mode of carrying it out which leads to disappointment. It is notoriously one of the hardest things in the whole of midwifery, to know when a head will just pass through a pelvis. In many cases, also, labour is induced too soon; experience shows that children less than 34 weeks old can seldom be reared successfully.

We are surprised that, although other less important measurements are given in the tables, the conjugata vera is omitted in every case. This is a pity, because the cases lose much of their value. It is a simple matter to take this measurement by the direct method, after the completion of labour.

Craniotomy was performed on 7 occasions. In cases where the child is dead, this is, of course, a justifiable operation. But in some of these 7 cases, we think that an operation for widening the pelvis might well have been preferred.

Eighteen cases of eclampsia were treated with a mortality of 33 per cent. It is interesting to note that in 4 of the fatal cases a small amount of albumen only was present. Table xx is an excellent one, and gives concise details of each case.

In conclusion we should like to congratulate the resident surgical officer, Dr. W. Fletcher Shaw, for the detailed and careful manner in which he has drawn up the report. The chief impression we have gained of the work of this hospital is the large proportion of pathological cases treated. If the clinical material is not great in quantity, in quality it cannot be surpassed. EARDLEY HOLLAND.

SELECT CLINICAL REPORTS.

(Under this heading are recorded, singly or in groups, cases to which a special interest attaches either from their unusual character or from being, in a special sense, typical examples of their class).

I.

A Case of Labour Complicated by Mitral Stenosis.

By Robert Jardine, M.D.

An unmarried primigravida, aged 19, was admitted to the Glasgow Maternity Hospital, at full time, suffering from cardiac disease. The patient had had rheumatic fever six years previously. Since then the heart condition had not troubled her to any extent, and she had been able to perform her work in a threadmill. During the pregnancy she had not experienced any inconvenience.

Condition on admission. The patient was thin, but fairly well nourished. There was no œdema of any part of the body. She was at full term, but not in labour. The cervix was fully taken up and the child, which was alive, presented by the vertex. The pulse was 80, full, regular, and of good tension. The heart was enlarged. The apex beat was displaced about ½ in. to the left, and the right border of the heart was about half-an-inch to the right of the sternum, and the dulness extended slightly lower than usual. A distinct thrill could be felt. Auscultation revealed the presence of a rough presystolic murmur which was best heard at the apex, and perhaps an inch or so nearer the sternum. No other adventitious sounds could be detected. The urine contained 1 per 1,000 albumen, but no tube casts.

On the second day after admission labour came on and ended naturally in 9 hours without any cardiac embarrassment. The labour was so easy that no interference was called for. There was not much blood lost in the third stage of labour. About an hour after delivery, while the patient was being taken up in the lift to the ward, she suddenly became deeply cyanosed, and had great difficulty in breathing. I was in the ward, and saw her within a minute or two of the attack. The heart area was found to be much increased. The apex beat was now at least 2 in. to the left of the nipple line, and the right border of the heart fully ¾ in. to the right of the sternum,

and the organ was much enlarged downwards. The whole cardiac area was the site of a tumultuous movement. One could feel the heart struggling to empty itself. The patient's breathing was extremely embarrassed. It was quite evident that unless the condition were promptly dealt with the heart would fail, so I asked Dr. Kilpatrick to open a vein in the patient's arm as quickly as he could. This was done at once and a pint of blood was drawn off. The relief to the patient was very striking, and by the time the bleeding was finished she was breathing fairly easily, and the tumultuous action of the heart had lessened very much. Strychnine was given hypodermically, and she was put on cardiac tonics. In the evening the pulse rate was 152. The urine was loaded with albumen.

Next day the patient had improved markedly. The cardiac area was reduced in size. A soft blowing systolic murmur could now be heard. The albumen had lessened.

Four days later the patient developed a cough, spat up some bloody sputum, but in a couple of days the blood disappeared from the sputum. By this time the albumen had disappeared from the urine. After that the convalescence was uninterrupted. The cardiac area gradually decreased, and at the time of dismissal, a month after delivery, it was less than it was at the time of admission. The child did well.

In cardiac cases I always like to see a free post-partum discharge of blood. If this patient had had a moderate post-partum hæmorrhage she would probably have escaped the terrible risk she ran.

REVIEW OF CURRENT LITERATURE.

New Methods of Treatment in Gynæcology.

EUGEN KAUFMANN (*Muenchener m. Wchns.*, 1908, No. 46, S. 2411) at the Frankfort Medical Society recently discussed the conservative methods of treatment of female genital disease to which much attention has of late been directed—especially, artificial congestion, compression (*Belastungslagerung*), intravaginal vibration massage, and the application of hot air. He exhibited and explained the methods of employing the various apparatus, and suggested the following indications for the different methods: Erosions and cervical catarrh may be cured by artificial congestion of the portio, and endometritic processes in a similar way after dilation of the cervix and the introduction of a sieve-like speculum into the uterus. Subinvolution of the uterus is much benefited by suction and scarification, procedures which are useless in hyperinvolution with amenorrhœa a condition much more amenable to organotherapy (ovaraden tablets). Pelvic exudations can generally be dispersed by artificial congestion, as supplements to which compression treatment and vaginal vibration massage are very effective. The two latter methods combined are good treatment for retrouterine hæmatocele and as preliminary measures in displacements of the uterus due to disease of the pelvic peritoneum or sacrouterine ligaments. Cautious reposition of the uterus can afterwards be effected without danger. Chronic gonorrhœal salpingo-oophoritis may be treated with quantities of hot air. Suction is useful in mastitis and to stimulate and increase the secretion of the breasts.

SIPPEL said that while the efforts to discover new methods of treatment merited recognition, we should avoid the substitution of new, complicated methods, more troublesome for both doctor and patient, for the older and more simple yet quite reliable methods, such for instance as the treatment of an erosion by suction instead of by the ordinary method. Moreover in the very proper endeavour to replace operative by non-operative treatment, we should be careful not to be misled by the mere word operative and induced to substitute for a simple, and when properly performed harmless, effective proceeding, hardly inconveniencing the patient, a much more complicated, tedious, disagreeable and quite possibly less reliable method, for example, to substitute plugging for a month for the simple use of the curette. It is also well to be very sceptical as to the alleged cures by new methods: no method was ever invented which has not been said to have, and really has had great success—for nature, with or in spite of the method, has effected cures, though the method did not do so. The future alone will disclose the real value of these new methods and allow us to distinguish between their apparent and actual effects. Hypnosis must be admitted to have, possibly, a restraining influence on menorrhagia since other psychic influences (fright) have been known to suppress the catamenia.

Röntgen Therapy in Gynæcology.

ALBERS-SCHONBERG (*Muenchener m. Wchns.*, 1908, No. 47, S. 2465) at the Hamburg Medical Society recently claimed that Röntgen treatment had won some of its most brilliant success in gynæcology; and that it was extraordinarily beneficial in the troubles and severe hæmorrhages caused by myomata, in molimina menstrualia, in metrorrhagia and in menorrhagia, in women in the climacteric period or in such so severe as to suggest total hysterectomy.

In France, Foveau de Courmelles, published 53 cases of the kind; his results were supported by Lengfellner and Görl, and more recently Fraenkel of Charlottenburg recorded 25 cases all of which, like the French ones, were successfully cured. The radiation proved most especially effective in women in whom, owing to serious myomatous hæmorrhages, the bodily strength and condition of the blood had seriously deteriorated. Even after a few radiations the hæmorrhages ceased, and on the conclusion of the course not only was the condition of the blood normal but the myomata were notably diminished, in one instance to one-half of its former size. In cases in which the hæmorrhage was not the most prominent symptom of the disease but the treatment was undertaken because of pains occurring generally before or else after menstruation, the same beneficial effects were observed. In all cases after a few sittings the menses ceased, not to return again. In two instances marked omission symptoms supervened in the form of profuse perspirations and flushings but these were only temporary and did not distress the patients. The mucopurulent secretion associated with myoma disappeared completely under radiation. The patients without exception admitted that with the relief of their hæmorrhages and other troubles, their general condition had improved wonderfully, symptoms of congestion in the lower extremities, such as swelling of the feet after much walking and so forth, had not recurred; their appetite was better and their constipation altogether removed. It was remarkable that these surprising improvements were obtained after a very few sittings; radiation repeated 14 times was as a rule sufficient. The greatest care was taken to avoid any irritation of the skin. The radiations were only employed externally through the abdominal walls, never intravaginally.

No explanation can at present be offered of the remarkable effects of the Röntgen rays upon myomata. The cessation of the menses may be referred to atrophy of the ovaries, which implies that this method of treatment should only be adopted for women in their climacteric years, and that in dealing with excessive hæmorrhage in younger women, total extirpation of the uterus would be necessary. As a properly instituted course of radiation does not in any way harm the patient and, on the other hand, may save her from severe operative measures, this method of treatment yielding as it does the most brilliant results, merits the gravest consideration as a therapeutic agent in gynæcology.

The Treatment of Metritis by Cupping the Collum.

F. Jayle and R. Loewy, Paris (*Zentralb. f Gyn.*, 1908, No. 45, S. 1493), have employed Bier's method of suction in a number of cases of metritis, perimetritis, adnexal diseases, etc., with most satisfactory results. The method of using the apparatus is well known, but in order to obtain a vacuum in the glass tube, these authors have employed a syringe that aspirates when the piston is pushed into the cylinder. This enables them to dispense with assistance otherwise indispensable, the cupping glass being held in one hand and the aspirator in the other. Each application lasted 5 minutes, and the sittings took place every day, the number being regulated by the reaction elicited and the effect upon the disease. The first application of Bier's cupping glass to the collum causes very decided pains in the pelvis and sacral region sometimes radiating into the legs, but after a few sittings these pains disappear almost entirely.

Clinical Experiences with Vaporisation.

Frankenstein, Cologne, (*Monatss. f. Geb. u. Gyn.*, Band xxxviii, Heft 4), has been induced by Pfannenstiel's sharp condemnation of vaporisation, to examine the results of the treatment obtained in the Kiel Frauenklinik during the last seven years, in 192 cases altogether. The primary results of atmokausis were good and vaporisation properly carried out caused no regrettable accidents. The method is not

adapted for younger women, or for myoma save in exceptional cases. The permanent results are satisfactory. The subjective results are better than those of mutilating operations. With prudently defined indications and careful technique, vaporisation will keep its place for the successful treatment of climacteric hæmorrhage.

Abscess of Gartner's Duct.

Magnus A. Tate (*Amer. Journ. Obstet.*, Nov., 1908) was consulted by a woman aged 36, married fifteen years and sterile. She had never menstruated, and never observed any blood issuing from the vagina. For several years she was troubled with attacks of pelvic pain accompanied by rigors, and followed by chills, rapid pulse and high temperature. These attacks would last for a few days or continue for a week or two when a little pus would escape from the vagina, and the symptoms would then subside. The patient would then get up and be able to attend to her household duties until the occurrence of a fresh attack from six months to a year later. When Tate saw the patient she was suffering from the worst attack that she had ever experienced. She had distinctly lost weight and the pulse rate and temperature were high. There was hypogastric tenderness; vaginal examination caused intense pain, preventing accurate examination, and it appeared that there had been for a few days a little watery discharge mixed with pus. Under anæsthesia, the uterus could be defined, it was small and anteverted, but the tubes and ovaries could not be made out by palpation.

Tate writes: "On the right wall at a central point between the anterior and posterior vaginal walls was found a decided thickening, and on tracing it up, it felt like a ridge of massed tissue which passed up to the side of the cervix in the vaginal vault. Being still at a loss to account for symptoms I opened the posterior cul de sac and on a careful palpation thought I detected a small fluctuant mass in the right broad ligament, but no ovaries or tubes were present, at least none could be detected by the examining finger. Packing some gauze in behind the uterus I then opened this ridge of vaginal ligament as far as I could."

Tate at the time looked upon this operation as purely exploratory and intended to operate from above if no improvement ensued, but pus escaped freely on the second day and the patient recovered. Tate kept her under observation for nine months and at the end of that time found her, as she had been ever since convalescence, in excellent health. She had regained her usual weight and there had not been any tenderness or vaginal discharge and, except that there was no menstrual flow, the patient was in a normal condition.

Tate refers to Amand Routh's monograph which includes the report of a similar case, and to Kelly's record of an instance in which the duct could be traced from close beside the cervix along the left lateral wall of the vagina to the vestibule on a level with the posterior wall of the urethra. Pus was discharged spontaneously and recovery followed. Watt, Veit and Milton of Cairo have published reports of vaginal cysts presumably developed from Gartner's duct, and these reports are noted by Tate in abstract. Tate also adds a good summary of theories and observations on the anatomy of Gartner's ducts in our species. Several authorities maintain that these ducts never persist as far forward as the urethra, but others are of the opposite opinion. Tate read the report of his own case at a meeting of the American Association of Obstetricians and Gynæcologists, hazarding the diagnosis, which seemed to him reasonable, of Abscess of Gartner's canal. Alban Doran.

Tuberculosis and Menstruation.

K. Eisenstein and J. Hollós, Szeged, (*Zentralb. f. Gyn.*, 1908, No. 44), draw attention to the remarkable fact that in a whole series of cases of dysmenorrhœa and amenorrhœa in tuberculous patients have been cured by Spengler's method of admin-

istering tuberculin. Among 70 cases of dysmenorrhœa, 27 were pronounced cases and tuberculosis was demonstrated in 23, occult in 4; of 22 submitted to treatment, 16 were quite cured. The results in amenorrhœa were even more remarkable favourable. The authors conclude that tuberculous foci are factors in the ætiology of menstrual disorders and that, on the other hand, such disorders often appear as symptoms of tuberculous infection. Occult foci may frequently be revealed by a tuberculin cure—and possibly with real benefit.

Treatment of Metrorrhagia by Injections of Animal Serum.

Lapeyre (*Compt. Rend. Soc. d'Obst. Gyn. de Paris*, 1908, T. ix.), from the treatment of five cases which he quotes, comes to the conclusion that the use of antistreptococcic serum has beneficial results in the treatment of uterine hæmorrhage. This method of treatment yields good results in hæmorrhage occurring about the time of the menopause; in those cases of tumours of the uterus in which the patient's power of resistance is lowered owing to repeated hæmorrhages and in which the cessation of such losses is to be desired in order to place her in a condition favourable for operation. The serum is also of use in cases of cancer of the uterus which are found to be inoperable. In some of the cases the patients had been treated with ergotine, chloride of calcium, hydrastis and other drugs, but with little result. Lapeyre claims for the serum treatment a rapid amelioration of the symptoms—complete cessation of the hæmorrhage, in some cases occurring within a few hours after the first injection. The risk of such treatment is very slight when administered by a competent person and when the patient is kept at absolute rest in bed for several days

A. Louise McIlroy.

Treatment of Uterine Fibromas.

Pierra (*Revue mensuelle de Gynécologie*, Sept., 1908) discusses the dictum of Pierre Delbet, that "all fibromas which may cause accidents should be removed." This though a simple formula lacks precision, for almost every fibroma does cause some, though perhaps slight, functional disturbance, such as dysmenorrhœa, leucorrhœa or habitual constipation, and the question arises whether these affections should be considered "accidents" Pierra prefers to reserve the term "accident" for more serious troubles which may re-act severely on the general health or may even compromise life. His conclusions are:

(1) Fibromas should be taken away, (*a*) where their growth is regular and rapid; (*b*) when they give rise to much functional trouble or pain, for such pain usually indicates implication of the adnexa or the formation of adhesions to neighbouring viscera; (*c*) when compression phenomena are severe: for example, affecting the rectum they may cause not merely constipation but veritable intestinal occlusion and auto-intoxication, stercoral in origin; or affecting the urinary passages, retention or incontinence of urine, albuminuria through compression of the ureters, or even pyelitis and pyelo-nephritis; cardiac trouble may also arise through upward displacement of viscera; (*d*) when degenerative or suppurative changes have appeared, for then the state of the general health demands immediate removal of the cause of toxæmia.

(2) Fibromas may be allowed to remain: (*a*) when they are apparently stationary in volume and persist without causing hæmorrhage, pain, or compression phenomena; or (*b*) when, on the other hand, the patient is so exhausted and anæmic from hæmorrhage that operation would be dangerous, or when there is serious organic lesion of the heart of kidneys.

(3) According to the age or social position of the patient. Fibromas may be removed or left, if their development is slow and functional disturbances slight. They should be removed if the patient is young, but left if she is near the menopause. If she must work for her living an immediate operation is desirable, if not, operation may be deferred.

J. H. F.

Cervical Rotation of a Myomatous Uterus.

SCHULTE (*Gynäkologische Rundschau*, 1908, Heft 21) reports the following case: A nullipara, aged 36, who until 8 weeks before her admission into hospital had been healthy, during that time had suffered from menorrhagia associated with the presence of a tumour smooth on its surface, except for an irregular prominence anteriorly, in shape resembling the Fallopian tube. By the vagina an ovary could be felt in the pouch of Douglas. Myoma with rotation was diagnosed, and on operation the uterus was found to be rotated, from left to right, through an angle of 90°. The uterus weighed 1350 gms. The ovaries were cystic and the tubes and broad ligaments œdematous.

E. SCOTT CARMICHAEL.

The Results of Doyen's Myoma Operations.

SCHOTTELIUS and ZACHARIAS (*Muenchener m. Wochns.*, 1908, No. 43, S. 2259). Schottelius advocates Doyen's method of operating for myomata; of 101 cases only 5 were fatal. Moreover as Zacharias reports, the ultimate results are relatively favourable. Three women, on whom the longitudinal incision was employed, had hernia larger than a fist, but none of those on whom Pfannenstiel's transverse incision was used had any hernia at all. Psychoneurotic disturbances, however, were frequently found to follow total extirpation. Molimina menstrualia appeared in one fourth of all the cases and vicarious menstruation, epistaxis and bloody expectoration regularly every four weeks, in one patient. One fifth of all the patients averred that their capability for earning their bread had not been improved.

Unexpected Freedom from Recurrence after Incomplete Operations for Uterine Cancer.

K. FLEISCHMANN (*Wiener kl. Wchns.*, 1908, No. 43) relates the histories of three cases in which the vaginal extirpation of uterine carcinomata was incomplete, portions of diseased tissue being unavoidably left behind, yet no recurrence had taken place during the time they remained under observation, relatively 5, 10 and 11 years, in the three cases.

Recovery from Inoperable Uterine Cancer.

WEINDLER (*Zentralb. f. Gyn.*, 1907, No. 22) reported three instances of unhoped for healing and recovery in cases of inoperable carcinoma of the uterus. In the first case vaginal total extirpation had been attempted in December, 1900, but had to be abandoned as the parametria were far more extensively infiltrated than had previously been supposed, and the danger of injury to bladder and rectum was extreme: during the antecedent scraping out of the cancerous crater the curette had slipped into a deep rotten cavity. The crater was freely burnt with the actual cautery and a dry dressing applied; the later treatment consisted of repeated cauterization of the crater with concentrated carbolic acid at long intervals. The vaginal fundus healed splendidly and Weindler reported the patient to be (in 1907) free from recurrence, well in herself and not having any hæmorrhage or discharge. The other two cases were instances of broken-down carcinoma of the portio with large crateriform cavities, the uterus, in each instance, being immoveably imbedded in infiltration. Both cases have been under observation since 1901. The treatment has consisted in thorough abrasion of all cancerous tissue within reach, cauterization with red hot iron and the systematic application of concentrated carbolic acid. Both patients were reported to be free from recurrence and quite able to do their work. In 1906 the walls of the retracted conical cavities were quite smooth, and in one case the uterus had become more moveable.

The Injuries to the Urinary System after Abdominal Operations for Uterine Cancer.

K. Franz, Jena (*Zeitschrift f. gynäkologische Urologie*, Band 1, Heft 1), has found that cystitis occurs in most cases after abdominal operations for uterine cancer only 20% of the patients escaping it: the preservation of the vesical branch of the uterine artery does not appear to influence its occurrence. Prophylactically and therapeutically he recommends the retained catheter, urotropin, foliæ uræ ursi, and in severe cases the injection of xeroform-sesame oil or solutions of nitrate of silver of increasing strength.

Vesicovaginal fistulæ arise either from necrosis of the bladder wall or from imperfect suture of vesical wounds. Injuries of the bladder inflicted during operation hardly ever heal but require a subsequent operation for fistula.

The chief cause of uterovaginal fistulæ is tamponade of the wound cavity and superficial injury to the wall of the ureter. Occasionally such fistulæ show an inclination to heal spontaneously. The danger of a ureteral fistula consists in the subsequent development of pyelonephritis on the same side.

Franz considers that, as an indispensable preliminary to any operation for cancer, the functional integrity of the kidneys should be tested by cystoscopy, catheterization of the ureters and chromocystoscopy, for it is always possible that the division of one or both ureters may complicate the case.

Teratoma of the Testicle with Intravascular Metastases macroscopically resembling Hydatid Mole.

W. Schmeel, Frankfurt (*Muenchener m. Wchns.*, 1908, No. 45, S. 2342), reports: A testicular tumour, the size of a fist, was removed from a man 35 years of age, and he died one year afterwards from extensive metastases. The primary tumour was cystic, the cavities being lined partly with layers of keratinized flat epithelium, partly with superimposed layers of cubical epithelium or a single layer of endothelium. Dense portions were also found consisting of chains of large epithelioid cells or gland like structures with colloid contents. The stroma of the growth was partly of embryonal, partly of mature, connective tissue, partly of cartilaginous tissue with calcification, and unstriped muscle. The metastases were of similar structure on the whole: with a mucoid groundwork of papillomatous villi enclosing numerous cysts with various kinds of linings. In the right side of the heart, there were free floating villi, some of them grape-like in form, and fibrillar structures which to the naked eye resembled a grape mole. Under the microscope, however, they showed the same structure as some of the metastases in the liver, and no syncytial elements could be detected. The villi consisted of epithelial tubes and cysts in a myxomatous stroma. The case is an additional proof against Schlagenhaufer's assertion that true hydatid moles occur in teratomata; on the other hand it shows that soft new growths which from mechanical causes have invaded the blood-vessels, may become elongated and assume a resemblance to hydatid mole.

Congenital Tuberculosis with special reference to Tuberculosis of the Placenta.

Sitzenfrey, of the University of Giessen, has recently published a monograph (Berlin, 1909, Karger Karl Strasse 15) based on Baumgarten's theory that hereditary tuberculosis is most frequently transmitted by a congenital transference of the tubercle bacillus from parent to child, and that there is frequently a latent stage in the development of the disease, so that it does not manifest itself until the first or second year of life, or even later.

Congenital infection by the Tubercle bacillus is considered in the first place as through the ovum and, secondly, by the spermatozoon.

The human ovum can be infected with Tubercle in cases of disease of the ovary

itself (intraovarian), or by the entrance of the Tubercle bacillus into the Graafian follicle from without (extraovarian), the ovary itself being healthy.

Cases are quoted proving that intraovarian infection of the human ovum by the Tubercle bacillus certainly occurs, but that an ovum so affected does not, as a rule, become fertilised. Extra-ovarian infection has not yet been definitely proved, but it is probable that, if it occurred, fertilisation and the further development of the ovum would be more probable than in the former case.

The results of the investigations carried out to ascertain the possibility of transference of tubercle from the father, show that although, in the human subject, no reliable observations have yet been recorded, there is no valid reason why the tubercle bacillus should not enter in, or along with, the spermatozoon.

Reference is made to a large number of cases showing the presence of congenital tuberculosis in the fœtus or newly born child. This has also been shown more definitely in the offspring of cows. Klepp has shown that 2·63 per cent. of tuberculous cows give birth to calves in which tuberculosis is already present.

Schmorl and his pupils have shown that placental tuberculosis occurs in two ways, firstly by the blood stream which is the most frequent source, or secondly by an extension of tuberculosis from the genital organs themselves. Histologically he distinguishes four forms of placental tuberculosis :—

1. Foci situated on the surface of the villi and in the intervillous spaces.

2. Primary villous tuberculosis, in which the interior of the villi is converted into tuberculous granulation tissue This form is not so common as the former.

3. Caseating round cell infiltrations in the decidua often leading to hæmorrhage and early separation of the placenta.

4. Chorionic tuberculosis.

Sitzenfrey has examined the placentæ of 26 tuberculous mothers, this including the membranes and the umbilical cord, and fœtuses born dead or which died shortly after birth.

In three cases the placentæ showed tuberculous changes, and in one there was a tuberculous endometritis of the decidua vera et reflexa.

Tuberculosis of the umbilical cord was present in one, and in another the veins of the decidua contained tubercle bacilli.

In one case tubercle was present in the placenta, the umbilical cord and the fœtal organs.

In placental tuberculosis, as shown by the three cases, the tuberculous foci were present in the basal decidua and in the interior of the chorionic villi, there being marked caseation of the foci in the latter situation. Venous congestion of the marginal chorionic capillaries as the result of infection of the syncytium often leads to the formation of infarcts bringing about an extensive tuberculosis of the chorionic villi.

Tuberculosis of the umbilical cord was shown by the presence of a nodule near its insertion to the placenta. Transverse microscopic sections showed tuberculous phlebitis and arteritis of the vessels with marked infiltration of the vessels walls. Tubercles were present in the intima of the umbilical vein as well as in the wall of the arteries, the vessels of the chorionic villi were also likewise infiltrated.

Similar changes have been previously described in the fœtal end of the umbilical cord (Stoeckel).

Fœtal Tuberculosis. Two cases occurred in which premature labour had been induced because of tuberculosis in the mother. Blood removed from the umbilical vein of the fœtus into guinea pigs gave positive result for tuberculosis. Histologically, however, there was no certain evidence of tubercle in the fœtal organs, except in one case in which a mesenteric and retro-peritoneal gland were both tuberculous. Tubercle bacilli were found in one case in the liver capillaries.

These observations would seem to show that placental tuberculosis in tuberculous mothers is not infrequent, and that children are frequently born apparently healthy where there has been undoubted placental tuberculosis. Sitzenfrey believes, however, that many children are already infected in intra-uterine life, and that the tubercle remains latent, and subsequently develops at varying periods post partum.

E. Scott Carmichael.

The Differential Diagnosis between Hydronephrosis and Ovarian Cyst.

W. Brändle, St. Gall (I.D., Zürich, 1908: *Zentralb. f. Gyn.*, 1908, No. 45, S. 1492), reports upon 8 cases from the Zurich Frauenklinik. One had been admitted into the surgical ward as a renal tumour and turned out to be an ovarian tumour. Four cases were submitted to abdominal section as ovarian tumours and proved to be cases of hydronephosis; removal was effected in three, but in the fourth, which was bilateral, had to be abandoned. The differential diagnosis is hard; the location, mobility and results of palpation of the two ovaries are symptomatic, but not always to be made out.

The Spontaneous Rupture of Ovarian Cysts.

Papanicol (*Revista de Chirurgie*, 1908, No. 7) says that the cases of spontaneous rupture of ovarian cysts, that is to say of rupture quite independent of any trauma, are very rare. There has almost always been some injury, though sometimes a very slight one, as, for instance, in one of his cases, a dose of castor oil. Of course a cyst does not easily rupture unless it has certain peculiarities—and changes. Torsion of the pedicle followed by increased internal pressure is one of the active causes. Partial thinning of the cyst wall owing to rapid increase in size or changes in the wall due to neoplasms, pregnancy and other factors are concerned in the ætiology. The prognosis is generally favourable, but surgical interference should be undertaken as soon as possible after the rupture, for spontaneous recovery, though not impossible, is extremely uncommon.

A Polypous Ovarian Cystoma.

A. Grasmueck, Saratow (*Zentralbl. f. Gyn.*, 1908, No. 45), reports a case of ovarian tumour, of the kind that has been described as grape-like cystoma by Olshause and as polypous cystoma by Amann, which is of interest since it affords information upon the origin of this form of new growth. Grasmueck found in the tumour removed by laparotomy characteristic epithelial growths which he considers to be indubitably remains of the primitive kidney. The structure of the canals and epithelium of the new grown cyst corresponded exactly with the structure of the constituents of the primitive kidney: the epithelium was cylindrical, ciliated here and there. He therefore concludes, as Bandler and Pfannenstiel already have alleged, that the tumour originated from remains of the Wolffian body and duct.

Enormous Ovarian Cysts.

O. J. Fay (*Surgery, Gynæcology and Obstetrics*, November, 1908) reports the following case: a woman, 54 years of age, had noticed an abdominal tumour since she was 33. Its size and weight had caused her discomfort since the birth of the last of her five children, thirteen years ago. For eleven months she had been unable to walk, on account of swelling of the abdomen and legs. She presented a greatly emaciated body with an enormously distended abdomen which measured at its greatest circumference 88 inches. In spite of her emaciated body she weighed 250 pounds. She was suffering from nausea and occasional vomiting and her legs were œdematous. The urine was normal. During the first ten days in hospital she was

tapped three times, the fluid withdrawn weighing 150 pounds. Its specific gravity was 1018 and it contained pseudo-mucin. On opening the abdomen a large amount of fluid and gelatinous semi-fluid material escaped. The cyst was multilocular and universally adherent. In many places the cyst wall had to be dissected off the parietal peritoneum. It was removed and the abdomen closed, drainage being employed. She made a good recovery from the operation but died from pneumonia which developed a month later. In a cursory examination of the literature Fay has found records of five ovarian cysts weighing over 200 pounds, of six weighing between 175 and 200 pounds (to these he adds his own) and of seven between 150 and 175 pounds.

MILES H. PHILLIPS.

Ovarian Cyst in a Girl of eight years old, Torsion of the Pedicle, Axial Rotation of the Uterus; Vioform Poisoning.

F. THELLUNG, Winterthur (*Zentralb. f Gyn.*, 1908, No. 44, S. 1464), gives a report of a child who sickened with the symptoms of acute appendicitis, but on laparotomy an ovarian tumour, the size of a small fist, was found in the right side. Developed within the ligament, it had drawn the uterus and right tube into its pedicle. There was a torsion of 360° degrees in the cervix and vagina. The tumour was removed and a tamponade of vioform gauze applied. From the second day after the operation, the child developed a condition of extreme excitement and mania, with a rapid pulse and moderate temperature, which persisted for three days, but, one day after the removal of the gauze, after several hours sleep was succeeded by a complete well being. Thellung attributes this complication to vioform poisoning.

Ovarian Dermoid in a Child aged 9.

WALDO (*Amer. Journ. of Obstet.*, Oct., 1908) recently reported before a meeting of the New York Academy of Medicine another instance of ovarian tumour before puberty. As usual, the new growth proved to be a dermoid cyst. It weighed eight ounces and had not been noticed until it had set up pain three days before the child was brought to the operator. Waldo found that the opposite ovary was as large as in an adult. Recovery was uncomplicated.

ALBAN DORAN.

Treatment of the Intestinal Tract and its Influence on Inflammatory Conditions of the Female Genital Organs.

KULIGA, Düsseldorf (*Gynäkologische Rundschau*, 1908, Heft 23) believes that reinfection from the bowel frequently leads to the persistence of tubal and ovarian disease and prevents the cure of many gynæcological conditions which, otherwise, might be rapidly effected. The rectum and colon are frequently involved in cases of adnexal disease, and Kuliga has been led to examine the condition of these intestines in 133 cases of such disorders. The rectum having been emptied, its sensibility, consistence and contractile power were estimated. A similar examination of the colon was then undertaken and in 62% of the cases it was evident that the rectum or colon (or both) were implicated in the morbid condition. He therefore recommends that free action of the bowels should be promoted by injections of olive oil, at first every night, and, later, on alternate evenings.

E. SCOTT CARMICHAEL.

The Etiology of Ectopic Gestation.

CHARLES D. WILLIAMS (*Surgery, Gynæcology and Obstetrics*, November, 1908) maintains that previous inflammation of the Fallopian tube is by far the most important factor in the etiology of ectopic gestation. He believes that clinical observations support this view, but in this paper he is chiefly concerned with the histopathological evidence. He has examined microscopically a number (the exact number is not stated) of pregnant tubes and in some instances the non-implicated opposite tube also. In every instance he found evidence of previous inflammatory changes in

both tubes. The most characteristic change was the formation of diverticula, which Williams terms *false* in contrast to *true* diverticula which are of congenital origin. These false diverticula are due to the coalescence of neighbouring longitudinal folds of the inflamed mucosa and are usually blind at the mesial and open at the distal end. Williams found them in every pregnant tube and also in the tube of the opposite side when it was available for examination. He believes that this condition is the chief predisposing cause of tubal pregnancy in 95 to 98 per cent. of cases. He quotes Opitz, who, having found similar diverticula in twenty-three pregnant tubes examined in serial section, expressed the view that their existence afforded a possible explanation of the occurrence of tubal pregnancy. True diverticula, on the other hand, were found only in a few instances by Williams during the macroscopical and microscopical examination of many thousands of normal and pathological specimens. Whilst discussing other possible causative factors Williams states his opinion that there is very little evidence in favour of the modern theory of implantation of the ovum, in uterus or tube, by means of the erosive power of its trophoblast. External migration does not necessarily mean delay in transit of the ovum and consequent undue increase in its size and stage of development, for the opposite tubal ostium is often closer and more accessible to the liberated ovum than the ostium of the same side. Accessory Fallopian tubes, and fibromyomata and polypi of the tube, are excessively rare and were not found in any of the cases examined. Williams dismisses Webster's "decidual reaction" theory becaue he found only a very limited formation of decidual tissue in any of his specimens.

MILES H. PHILLIPS.

Abdominal Pregnancy.

A. JARZEFF, St. Petersburg (*Monatss. f. Geb u. Gyn.*, Bd. xxviii, Heft 2), gives a critical review of the various views about abdominal pregnancy, and draws special attention to the fact that various forms of ectopic pregnancy may simulate true abdominal pregnancy. The diagnosis of such a condition in an anatomical preparation requires therefore very great care. Only such cases can be considered true ones as those in which neither tubes or ovaries are concerned in the formation of the ovisac. He describes a case of his own. The patient was a childless woman, whose menses had been omitted once only. Her abdomen was moderately distended and very tender: and there was a tender resistence to palpation in the posterior vaginal vault. Bilateral adnexal tumours was the diagnosis made and, after conservative measures had been tried for some time without any involution of the tumour, a vaginal operation was performed which proved that the pouch of Douglas was filled with blood clots with a fœtus lying among them. Moreover a dermoid cyst was found on each side and both were removed. The tubes were normal. The woman made an uninterrupted recovery. Microscopical examination of the dermoid cysts proved that they did not contain any elements of an ovum, but corpora lutea were found in the walls of each cyst. Microscopically also the tubes proved quite normal. Jarzeff concludes that in this case he had to do with a primary abdominal pregnancy, and that true abdominal pregnancies, though rare, do occur in women. In the present state of our knowledge, however, we cannot with certainty affirm either that the ovum implanted itself primarily on the peritoneum, or that it passed through the early stages of its development in the tube or in the ovary.

The Etiology of Eclampsia.

MIRTO (*Annali di Ostetricia*, September, 1908) publishes some considerations referring especially to researches he has recently made on the relationship between the weights of the placenta and the fœtus in over 100 cases of eclampsia, and to similar researches made by other observers in normal pregnancies, and in pregnancies complicated by syphilis or by albuminuria. On comparison of his results

with those got in cases of albuminuria and in normal pregnancy, Mirto finds: (1) that the relation in weight of the fœtus to that of the placenta is always less in eclampsia than in the other cases, indicating a greater deficiency in the development of the fœtus; (2) that the relation in the weight of the fœtus to the placenta was less in albuminuria than in normal pregnancy. It is therefore reasonable to suppose that there is normally a certain correlation between these weights, that the fœtus develops less where the placenta is diseased, and that the greatest disproportion is found in connection with the eclamptic placenta. This placental insufficiency may be due either to under-activity of the placental cells, or to a diminution in the size of the active healthy area of the placenta. In many cases naked eye observation of the eclamptic placenta showed that almost one-third of the total placental area was occupied by infarcts.

In a previous article, Mirto advanced the hypothesis that placental insufficiency might allow the passage into the maternal circulation of certain fœtal waste products, usually neutralised by placental secretions, and that more or less severe toxæmia might thus arise, and in some cases result in eclampsia. The value which he now attributes to placental insufficiency in the genesis of eclampsia is a relative one, and he justifies this opinion by a brief reference to recent researches. He thinks that the hypothesis which most accurately corresponds to facts is that of Pestalozza who holds that the passage into the maternal blood of the easily dissociated elements of a diseased placenta may excite eclampsia. It is experimentally proved that injections of an eclamptic placenta are much more toxic than those of normal ones. It is also proved that the serum of an eclamptic infant is much more toxic than that of a normal one, and these facts may be adduced in support of the opinion that the eclamptic poison is fœtal in origin.

The idea that eclampsia is due to the passage of an increased number of healthy syncytial cells into the blood-stream and to their dissolution there, has not been demonstrated, and though Mirto has obtained the same results as others by injections of healthy placenta, he does not consider it justifiable to assert that idea: (1) because the time between inoculation of the animals and appearance of convulsions was too short to warrant ascribing the convulsions to dissolution of syncytial cells, and (2) because similar convulsions were produced after injections of liver and kidney, and therefore such results are only toxic phenomena common to all intoxications from animal albumens.

The importance of renal lesions in eclampsia is well known, and though in most cases these renal lesions are secondary to the uterine condition, cases of recurring eclampsia in women affected by chronic nephritis, seem to indicate that nephritis may be a primary determining cause and placental intoxication a secondary one only.

Giving the utmost importance to liver and kidney changes, the results of experiments made by Vassalé, Vanderlinden, and others, cannot be ignored, for in many cases cure has resulted from the administration of thyroid or para-thyroid extracts.

So long as the functions of the various organs destined for the elimination or neutralisation of toxins remain uninjured, even though, through pathologic causes, there is an increase of poison in the system, no serious consequences may be observed because there is a chance of regaining equilibrium. If, however, the fœtal toxins increase so much that alterations result in the different organs, especially in the liver and kidney, the dangerous effects of diminished activity react on the maternal organism. Other organs such as the thyroid, parathyroid, or supra-renal capsules play a part in neutralising toxins, and failure in their function may be signalised by an outbreak of eclampsia. This would explain the efficacy of some gland extracts in certain cases of eclampsia and their failure in others.

The general conclusion is that the eclamptic poison is of placento-fœtal origin, and that the maternal organs, which eliminate or neutralise circulating toxins, are usually

secondarily, but sometimes primarily altered, and contribute to the outbreak of the disease.

Whether, according to modern views, the eclamptic poison produces antibodies in the blood capable of "sensibilising" the toxins and that the outbreak of eclampsia is due to "hyper-sensibility" as Van Pirquet calls it, or to "anaphylassia" to use Richet's term, we are not yet authorised to admit. J. H. F.

The Treatment of Eclampsia.

Reifferscheidt, Bonn (*Muenchener m. Wchns.*, 1908, No. 43, S. 2278), says that the favourable results of immediate delivery in Bumm's klinik have been confirmed at Bonn. It is true that out of 30 patients delivered immediately, 8 died, but in only 15 of the 30 could this treatment be adopted in time: that is to say, when there had been no more than from 1 to 3 attacks of convulsions; and of these 15 only 2 were fatal. In 6 women, delivery had taken place before the eclampsia declared itself, and 3 of these women died and must be taken into account in estimating the value of the method. When the os uteri was undilated, immediate delivery was not favourable for the mother but was so for the child; three times as many children were born alive as during the expectative treatment. On this account, rapid delivery, if necessary by means of vaginal Cæsarean section, though not adapted for the treatment of eclampsia in private practice, will be continued in the klinik. Narcotics are discarded on principle; on the other hand, venesection and the infusion of salt solution were frequently tried. Forced diaphoresis was not employed, but digalen, camphor and artificial respiration were given to reinforce the action of the heart. Decapsulation of the kidneys in two cases increased the diuresis but did not avert death; it is nevertheless worth trial in suitable cases.

Decapsulation of the Kidneys in Eclampsia.

E. Runge (*Berliner kl. Wchns.*, 1908, No. 46) reports three cases of severe eclampsia prolonged into the puerperium, in which attempts were made to save the patients by renal decapsulation, but unhappily without success in any of the three. He gives the number of cases operated upon up to date as 17, and the mortality as 53 per cent., but considers that no definite opinion upon the value of this method of treatment, which aims chiefly at the removal of venous congestion and anuria, can yet be formed.

The Treatment of Placenta Prævia.

Henkel (*Archiv f. Gynäk.*, Band 86, p. 688) commences an exhaustive paper by comparing the mortality of placenta prævia in hospital and in private practice, estimating the former at 7·8 per cent. to 5·85 per cent., the latter at 19·7 per cent. He then discusses the various forms of placenta prævia, and attributes the comparative rarity of central placenta prævia at term, to the fact that central cases generally abort during the early months of pregnancy. As to the ætiology, only 11·7 per cent. of the patients are primiparous women. The infant mortality is enormous and although 50 per cent. are born alive in hospitals a great number of these subsequently die. He then dwells on the great difficulty which the general practitioner has in dealing with cases of placenta prævia: the surroundings often in dirty homes, the absence of an able assistant and a suitable table, and the want of practice in the necessary but difficult manipulations, should induce the general practitioner to send every case to hospital as soon as diagnosed. An ordinary medical attendant is very rarely able to insert a bag satisfactorily and without injury to some of the soft parts.

Henkel strongly advocates plugging, not with balls of wool, as so often done abroad, but with gauze bandages tightly wrung out of a 2 per cent. solution of alum. Shaving the vulva and disinfecting the external parts should, if possible, precede the plugging, and the bladder should be emptied. The plug can be further supported by

a T bandage. If the liquor amnii has escaped, plugging is of no use, and he advises version as soon as the os allows one finger to pass. He does not recommend bags which often enlarge existing tears, and so hasten a fatal end in women who have already lost much blood. He thinks that at the 8th or 9th month the os will generally admit one finger and warns against delaying version until 2 fingers can be introduced. When version cannot be performed, he advises vaginal hysterotomy. He takes the precaution of injecting ergotin before turning which often prevents subsequent atony of the uterus. On the whole Henkel attaches little importance to the life of the child and says it must in most cases be sacrificed for the benefit of the mother. In one case, however, a patient was very keen to have a living child. She was a woman with a contracted pelvis who was to have come into hospital for abdominal Cæsarean section at the end of her pregnancy, but had an attack of hæmorrhage, a few days before this period and, on her admission, placenta prævia was diagnosed. Henkel performed hebosteotomy followed by vaginal hysterotomy (the whole operation only lasted 13 minutes), extracted a living child, and the mother did well.

Henkel then goes on to discuss post partum hæmorrhage after placenta prævia resulting from an atonic uterus, and says that the only efficacious means of dealing with this complication is to compress the uterine arteries by the following technique: He inserts the posterior blade of a speculum, catches hold of the anterior and posterior lips of the os with one pair of forceps, and pulls the uterus downwards and forwards. He then clamps the left parametrium by pulling the uterus to the right, and vice versa, and carries out the compression in such a way as to include some of the uterine wall. The bladder and ureters are rarely injured, as they recede when the uterus is pulled down. He generally leaves the clamps on for 24 hours, they are then opened and, if the hæmorrhage does not recur, they are removed after an hour. Plugging an atonic uterus is useless in most cases and very dangerous as, in the endeavour to obtain sufficient pressure, the fragile organ is often ruptured.

H. T. Hicks.

The Treatment of Placenta Praevia.

B. Krönig, Freiburg (*Zentralb. f. Gyn.*, 1908, No. 46), points out that under the usual methods of treatment of placenta praevia the mortality of the mothers is from 6 to 10 per cent., that of the children from 60 to 80 per cent. The maternal deaths are mostly due to hæmorrhage, the chief source of which lies in the lacerated vessels of the isthmus and upper part of the cervix. Any stretching of the isthmus therefore should be avoided, and Krönig considers that this can be done by abdominal cæsarean section while he thinks vaginal cæsarean section hazardous. He has performed the former operation in 6 cases of placenta praevia and encountered very little hæmorrhage All the mothers had living children, got up on the first day after the operation, and were discharged within the first three weeks. One child delivered before time did not survive. When the os uteri is completely dilated version remains the proper treatment: in infected cases Krönig recommends vaginal Cæsarean section or Braxton Hicks method of turning.

The Treatment of Rupture of the Uterus.

Schuette (*Muenchener m. Wchns.*, 1908, No. 43, S. 2257) since the year 1903 has had to treat 19 cases of rupture of the uterus; on admission to the klinik, 5 were infected beyond hope, 1 was an old case and, of the remaining 13, 11 were instances of serious and complete rupture. In these 13 recent cases Schuette had only one death, the other 12 recovered and the old case, in which the child had been for weeks in the peritoneal cavity, also got well. He attaches especial importance to the treatment of the retroperitoneal hæmatoma which should be drained through an anticlinal opening at the time of operation. He does not consider the danger of

transporting the patient into hospital so serious as to interfere with the indications for operation with subperitoneal drainage. Even in incomplete ruptures, if untreated, the prognosis is unfavourable.

The Prevention of Air Embolism in Obstetrics.

E. Opitz, Düsseldorf (*Zentralb. f. Gyn.*, 1908, No. 46), states the conditions for the occurrence of air-embolism to be: the entrance of air into the genitals, negative pressure in the venous circulation, and some circumstances that keep the vessels open. These conditions are most frequently fulfilled in placenta praevia, Cæsarean section while the pelvis is raised, and when air is admitted into the uterus before the rupture of the membranes. The precautionary measures should therefore provide for the prevention of: (1) the entrance of air into the genital canal; (2) a negative pressure in the abdominal venous circulation; (3) any conditions which if air should be admitted, would place that air under increased pressure; (4) and they should afford special protection in placenta praevia. The position of the parturient woman is of extreme importance especially during obstetric operations and, when she is laid across the bed, care must be taken that the upper part of her body is elevated. Opitz, observing these precautions, has not had a single case of air-embolism in about 4,500 confinements.

A Point of Technique in the Conservative Cæsarean Operation

Macé (*Bull. Soc. d'Obst*, Paris, 1908, Nov.) draws attention to a method of incision of the uterine wall and fœtal sac which he has used in two cases with good results. The methods employed as a rule by most surgeons are : (1) The classical one of incising the uterine and sac walls at the same time. This incision intersects the muscle, the fœtal membranes, and also the placenta if it happens to be inserted on the anterior surface; it is carried from below up to the fundus of the uterus, and results in hæmorrhage from the muscular wall and from the placenta. The latter, in most cases, being a source of danger to the child. (2) In the other method the uterine wall is incised first and the sac enucleated entirely from the cavity of the uterus.

Macé's own method of procedure is as follows:—after incision of the muscle, as soon as palpation of the uterine wall reveals the presence of the placenta on the anterior surface, the left index finger is introduced into the wound and pushed under the muscle, the placenta being separated with the dorsal surface of the finger while the uterine wall is divided with scissors. In both the cases quoted the membranes were found above the placenta and opened, and the fœtus extracted through the incision. There was very little hæmorrhage from the uterine incision and the fœtal placental circulation was not laid open.

A. Louise McIlroy

The Indications for Hysterostomatomy.

Ludwig Seitz (*Muenchener m Wchns.*, 1908, No. 46, S. 2413) reports upon 36 cases of vaginal Cæsarean section done by the Bumm-Doederlein method, which consists in splitting the anterior wall of the cervix and uterus wtihout detaching the bladder and without prolonging the incision into the anterior wall of the vagina. He prefers the term hysterostomatomy to vaginal Cæsarean section. The indications for the operation were:—In 3 cases, eclampsia; in 2, premature detachment of the placenta; in 7, placenta prævia, 4 times to save the child, 3 times to avoid further hæmorrhage; in 2 cases, prolapse of the cord; in 5, rigidity of the cervix; in 3, fever in labour; in 2, pyelitis gravidarum; in 2, to allow the version of a cross birth and save the child's life; in 3, for the induction of premature abortion or labour in advanced tuberculosis; in 3, hyperemesis and ptyalismus; in 2, protracted abortion due to torpid uterus; and in 2, with hebosteotomy, for contracted pelvis. All the

women recovered; two had moderate fever and four others slight rise in temperature. Of the children, 18 of which were alive and viable, 16 were saved. Seitz thinks that the indications for hysterostomatomy may be extended especially for the sake of saving the life of the child; it is, however, an operation for hospital not for private practice.

Central Perineal Tear.

Nebesky (*Gynäkologische Rundschau*, 1908, Heft 23) reports a central laceration of the perineum after an occipito-posterior presentation, in a primipara aged 28. A fistula about the calibre of a slate pencil formed immediately in front of the rectum, the posterior commissure and anterior part of the perineum being intact. He attributes the laceration to the narrowness of the pubic arch in the first place and, secondly, to the depth of the perineum.

E. Scott Carmichael.

Prolonged Retention of the Human Ovum in the Uterus after Death of the Fœtus.

Dervaux (*Bull. Soc. d'Obst.*, Paris, 1908, Nov.) feels justified in reporting two cases which were exceptions to the rule that the death of the fœtus during pregnancy is usually followed by the expulsion of the uterine contents without much delay.

The first case quoted is that of a patient who retained in her uterus, for nine months, a complete ovum which had died about the third month of pregnancy. There was a history of an abortion some years before, when the placenta was retained for ten days without sepsis occurring. On this occasion, when she was three months' pregnant, the usual symptoms of pregnancy ceased without any known cause, but the menstrual periods did not appear. There was a feeling of weight in the abdomen, and a few months later some slight lacteal flow was noticed, but no varicose condition was present. The uterus on examination was found to be about the size of a four months' pregnancy, rounded in outline, and softened but with a hard hypertrophied cervix. Three months later, at the supposed term, a fleshy mass was expelled having the appearance of a degenerated placenta. On one side of this mass was seen a small mummified fœtus, flattened out and attached by its umbilical cord.

In the second case the patient, who had borne several children, had had a previous abortion due to typhoid fever. Three months after their onset the symptoms of pregnancy ceased, the cause being the taking of large doses of apiol. Sickness and leucorrhœal discharge occurred but no hæmorrhage. When examined three months later the diagnosis of an intra-uterine pregnancy of four months' duration was made, with the possible alternative of an extra-uterine gestation.

Following the examination hæmorrhage occurred which lasted, with varying amount, up till the time of delivery.

The uterus on examination later was of the size of a four months pregnancy, irregular in outline, mobile, with the cervix enlarged and softened. Expulsion of the uterine contents occurred eight months after the onset of the symptoms of pregnancy. The fœtus was found to be mummified and to be about five months developed. The placental surface was covered with little pedunculated tumours—hæmatomata—formed by the œdematous infiltration of the surface villi.

The difficulties in the diagnosis caused by the want of agreement of the history with the examination of the uterus are well known. The best signs to observe are the form of the uterus, its consistence and its mobility. The cause of the retention is unknown, and the author mentions the theory that the placenta may become quasi-parasitical and adapt itself to a new life, as is seen in cases of placental polypi. The tolerance of the uterus itself plays an important part. The cause of death in the fœtus and the difference in the vascular lesions of the placenta may have some influence in the retention of the products of conception.

A. Louise McIlroy.

Imperforate Rectum: Impervious Ureters: Normal Kidneys.

Garipuy and Berny (*Comptes Rendus de la Soc. d'Obst. de Gynéc. et de Paed. de Paris et de la Soc. d'Obst. de Toulouse*, November, 1908) report a case where a primipara gave birth to a child about three weeks before term. Labour was rather prolonged and the liquor amnii extremely scanty. The child, a male, measured 17½ inches and weighed 4¼ lbs. On the second day the child's rectal temperature was taken, but owing to a complete obstruction the thermometer could not be introduced far, and when withdrawn it was seen to be dry and unsoiled by fæces. No meconium was found on the child's linen which, however, was a little damped. An operation was performed to open the bowel, which could not be reached until a portion of the sacrum was excised. The blind end of the rectum was then sutured to the integuments of the anus without difficulty and laid open. Meconium passed freely but the child died a few hours after the operation. The alimentary tract showed no malformations beyond that which had been overcome by the operator, nor had any meconium escaped into the peritoneal cavity. The urinary tract alone was at fault. The urethra and bladder were well developed, but the latter was empty. Both ureters were impervious in the middle of their course The kidneys were normal in size and structure, and there was no trace of hydronephrosis.

The authors, after noting that the operation for impervious rectum would without doubt have succeeded but for the stricture of the ureters, add that the latter malformation explained the oligohydramnios during the mother's pregnancy. They also dwell on the absence of hydronephrosis, although the stricture of the ureters was complete. Tuffier has already shown that hydronephrosis is associated with partial stricture of the ureter, whilst when that duct is absolutely occluded the corresponding kidney undergoes sclerosis and atrophy, and any dilatation of the renal pelvis which may be present at first disappears very soon after the beginning of the atrophic processes.

[See: "Dystocia due to Distension of the Urinary Bladder of the Fœtus, with remarks on Renal Secretion" (*Proc. R. Soc. Med*, Nov., 1908, Obstet. and Gyn. Section, p. 1). In Hauch's case of Oligohydramnios (*L'Obstétrique*, Aug., 1908, p. 373), the fœtus had no kidneys.]

For the association of arrested development of the urinary tract with imperforate rectum see Professor Arthur Keith "Demonstrations of Malformations of the Hind End of the Body: (Rectum and Anus," *Brit. Med. Journ.*, Dec. 2, 1908). Keith, in examining a series of specimens illustrating imperfect rectum in human subjects, found occlusion of the ureter in 1 case and low implantation of the ureter in 3. The urethra was imperforate in 2, and the bladder dilated in 5, independently of urethral stricture. There was urachal fistula in 1, hypospadias in 1 and ectopia vesicæ in 1. *Rep.*]

Alban Doran.

Researches on the Meconium.

Ibrahim (*Muenchener m. Wchns.*, 1908, No. 43, S. 2259) reports upon the peptic ferments found in the meconium of infants dying shortly after birth. He found all the ferments which exist in the digestive juices of adults, present in the meconium. Erepsin, as well as diastase lactase, invertin and maltase, which have so much to do with the metabolism of the carbohydrates and, finally, a powerfully acting fat-splitting ferment. He suggests that, in congenital occlusion of the intestine, some idea as to seat of the occlusion might be drawn from the absence of particular ferments.

REPORTS OF SOCIETIES.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

SESSION 1908—1909.

Meeting I., October 28, 1908, Dr. J. M. MUNRO KERR, *President, in the Chair.*

LANTERN AND MICROSCOPIC DEMONSTRATION OF AN EXTREMELY EARLY HUMAN OVUM (TEACHER-BRYCE OVUM).

BY DR. JOHN H. TEACHER.

The specimen was found by Dr. Teacher in a portion of decidual membrane which had been sent to him by Dr. Douglas Brown for examination with a view to determining whether it was part of an abortion or a membranous dysmenorrhœal membrane. The patient, who had never been pregnant, had passed the date of her period by several days. The full history of the specimen has been published elsewhere.

The ovum proved on examination to present so many features of interest, and so many peculiarities not previously seen in the human ovum, that Dr. Teacher invited Dr. T. H. Bryce to collaborate with him in the description of it, in order that justice might be done to the difficult embryological questions which were raised. Further, it was deemed wise, before publishing any detailed description, to submit the specimen to those most competent to criticise, and it was accordingly demonstrated at the meeting of the German Anatomical Society in Berlin last April. Very favourable opinions were expressed as to the general condition of the ovum, and it was also accepted as being most probably normal, and distinctly younger than that of Peters. This conclusion has since been accepted by Prof. Peters himself in a recent number of the *Monatsschrift für Geburtshülfe und Gynækologie*, The specimen ranks, therefore, as the earliest stage of the human ovum at present known.

November 25, 1908, Dr. J. M. MUNRO KERR, *President, in the Chair.*

Dr. JOHN H. TEACHER gave a demonstration on

THE ESTIMATION OF THE AGE OF EARLY HUMAN OVA AND THE NATURE OF MENSTRUATION.

The communication was of the nature of an appendix to the demonstration of the Teacher-Bryce ovum on October 28th. For the calculation of the age of that ovum very precise data were obtained, and it seemed to the authors of the memoir possible, on correlating them with the data obtainable from other early ova, to construct a table showing the ages of early ova with more exactness than was possible under the customary rule—the convention of His.

In the case of the present ovum practically only a single coitus had to be considered, and the total interval of time between this and the completion of abortion was 16½ days. If 24 hours were allowed for the time occupied by the spermatozoa in traversing the genital passages and effecting fertilization, and about a day were deducted for the period which was occupied by the process of abortion, a probable maximum age of 14½ days is obtained.

With respect to menstruation the calculation is as follows. The abortion commenced eleven days after the date on which menstruation should have begun. The degenerative changes of the endometrium are known to commence some time before the appearance of the discharge; it therefore seems necessary to allow some time (possibly as much as three days) during which the fertilized ovum exercises some influence over the uterus, which results in the arrest of the destructive process.

The minimum possible age might therefore be taken as at least twelve days. A computation of from 13 to 14 days is therefore probably correct; moreover this was found to agree with such facts of comparative embryology as were applicable.

Dr. Teacher demonstrated a table showing the estimated age of twelve selected early ova, ranging in size from the ·77 of a millimetre of the Teacher-Bryce up to the 10 millimetres of v. Spee's "Gle." Fairly precise data for the estimation of the age of the ova are obtained from five out of the other eleven cases, namely those of Merttens, Beneke, Reichert, Rossi Doria, and Eternod. By utilizing these data and correlating them with the dimensions and state of development of the ova it was found that the ova could be arranged in a series in which dimensions and ages gradually increased. The present ovum being taken as from 13 to 14 days, that of Peters was estimated at from 14 to 15, and the others formed a series of which the last number was v. Spee's "Gle" regarded as from 19 to 20 days old.

Having obtained in this manner a chronological sequence in which the age is calculated from fertilization, a second table was constructed to show at what periods of the month fertilization and imbedding would have taken place on the basis of the first table. The termination of pregnancy being known the date of fertilization was arrived at by subtracting the age of the ovum in each case, and allowance was made for the various circumstances under which the ova were obtained. The date of imbedding was fixed by assuming, in accordance with the views of v. Spee, that seven days elapse between fertilization and implantation of the ovum in the endometrium.

The second table showed that, if the ages of the ova be correct, fertilization may occur at any time during the intermenstrual interval, and that imbedding may take place either in the period of quiescence or in the period during which, without the occurrence of pregnancy, the pre-menstrual and menstrual changes would have been progressing.

The result of this seriation of these early cases is not consistent with the older views regarding menstruation and its relations to imbedding, for it carries with it the conclusions that the menstrual decidua is not a preparation for the reception of an ovum in the old sense of the words; that menstruation is not an abortion of an unfertilized ovum; and that ovulation does not necessarily coincide with menstruation. The conclusion is not inconsistent, however, with the recent views on menstruation as developed by Heape and supported by a considerable number of comparative researches.

According to Heape the menstrual cycle in man and monkeys is homologous with the œstrous cycle of the lower mammals. The œstrous cycle is divided by Heape into pro-œstrum, œstrum, and diœstrum.

Menstruation in the human subject corresponds with the latter part of pro-œstrum as first pointed out by Heape, and the period of desire, "œstrum," during which alone animals will receive the male, corresponds to the days immediately following the cessation of the menstrual discharge in the human female. This homology is apparent not merely in the gross phenomena of the two processes, but also in the histological changes which accompany them.

In the lower animals it is clear that the œstrous cycle is a preparation of the endometrium for the reception of the fertilized ovum; but the preparation lies not in the phenomena of the pro-œstrum but in the reparative processes which follow it.

In the human subject and monkeys, according to Heape, the menstrual cycle is a preparation for the reception of a fertilized ovum in the same sense; viz., the reconstitution of the endometrium after the destructive changes of premenstrual and menstrual periods of the cycle is the real preparation for the reception of the fertilized ovum. The data contained in the tables lead, by a different route, to precisely the same conclusion.

Menstruation is thus a cyclical process which provides for the maintenance of the endometrium in a suitable condition for producing the decidua of pregnancy, but the ovum is not dependent upon the development of a menstrual decidua for a suitale nidus upon which to become imbedded. The uterus is capable of developing a decidua of conservation whenever its integrity is threatened by the growing ovum.

Dr. SAMUEL SLOAN said he listened with much pleasure to the demonstration which gave the most recent theories on menstruation. He had heard it stated that in very cold regions there was scarcely any discharge during menstruation, he would like to hear Dr. Teacher's comment on this statement.

Dr. MACLENNAN congratulated Dr. Teacher on the possession of such an ovum—the youngest from its size, which is a better method of estimation than by taking the age. It is now a well known fact that ovulation has nothing to do with menstruation. Such a demonstration required careful thought before it could be discussed properly.

Dr. DONALD DUFF asked Dr. Teacher his views on the formation of the corpus luteum in the ovary; if it occurs every month it should be seen more frequently when an ovary is examined during operation.

Dr. JOHN LINDSAY complimented Dr. Teacher on his valuable demonstration, the most interesting point being the table showing the ages of the various ova. That the series should have fallen into such natural order seems surprising when most of them were obtained from abortion cases. The ova obtained by abortion and by operation may be pathological, those by abortion being *ipso facto* pathological. Dr. Lindsay had examined four ova of this kind and three of these showed malformations and one was macerated. The uterus is a very tolerant organ, and when it casts off the products of conception it indicates that they are no longer worth retaining, therefore the majority of the causes of abortion lie in the ovum itself. In the early stages of development the ovum is very plastic and undergoes changes rapidly, interference causing a gross departure from the ordinary course of events. Nothing can be deduced from the size of the ovum; an embryo of apparently six weeks of age may be no further developed than one of three weeks.

The PRESIDENT thought that the important fact in the demonstration is that the ovum is embedded in the fresh young endometrium. As examples of ovulation being independent of menstruation there is pregnancy occurring during lactation when menstruation is suppressed. In young women with absence of menstruation, when the abdomen is opened for the cure of dysmenorrhœa, the ovaries are sometimes found to be normal in size, and yet the uterus may be mal-developed. It must not be forgotten that the two are closely related as, when both ovaries are removed, as a rule menstruation ceases.

Dr. TEACHER in reply said, that hæmorrhage does not occur during menstruation among some primitive races in cold regions. The corpus luteum is a gland to assist the development of the ovum and is formed every time an ovum is discharged. In reply to Dr. Lindsay he might quote Peters' reply "that the ovum may be pathological but it is the only one." The Peters' ovum may be entirely normal; the Teacher-Bryce ovum is quite consistent with many of the points got from the other ova. Many aborted ova are normal, in one specimen the cause of abortion was influenza and in another dancing. The ovum is embedded in the young healthy endometrium and is capable of embedding itself anywhere irrespective of menstruation.